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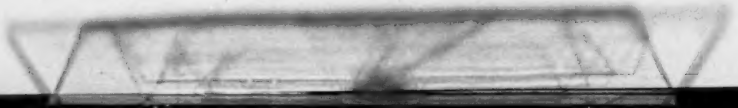

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DEVOTED TO THE ART

AND SCIENCE OF

ORAL SURGERY

JOURNAL OF ORAL SURGERY

Reed O. Dingman, M.D., D.D.S., Editor

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VOLUME 10 • JANUARY 1952 • NUMBER 1 JOURNAL OF ORAL SURGERY

Treatment of depressed fracture of the zygomatic bone

■ *Walter W. Crowe, D.D.S., Bremerton, Wash.*

Depressed fractures of the zygoma are commonly seen as the result of severe external force, and are often associated with fractures of the nasal bones and maxilla.

Because the edema and ecchymosis of the overlying soft tissues often conceal the depressed zygoma, such fractures are frequently overlooked and remain unrecognized and untreated.

At the time of injury the depressed bone may be elevated easily into normal position, but if overlooked or neglected a conspicuous flattening of the face results, which is difficult to correct even by reconstructive methods.

The zygoma, or cheek bone, is small and quadrangular in shape. It forms one of the most prominent parts of the face and part of the lateral wall and floor of the orbit. This bone is dense, not readily fractured and is a buttress between the face and the skull. As a rule, if injury to this region takes place, the body of the zygoma is not fractured, but one of its four processes may be.

In severe facial injuries, diplopia and other ocular disturbances may be present. There may be limitation in movement of the eye caused by muscular injury and pressure of bony fragments, or alterations in the level of the globe when the floor of the orbit is displaced or comminuted.

Mandibular movements may be limited if the zygomatic arch is depressed inward against the coronoid process.

The diagnosis of fracture of the zygomatic bone is based on the history, local appearance, palpation, roentgenographic studies and the following signs and symptoms:

1. Facial swelling.
2. Depression or flatness of the face.
3. Limitation of motion of the mandible resulting from muscular spasm, mechanical obstruction (depression of the

The opinions or assertions contained herein are the private ones of the author and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

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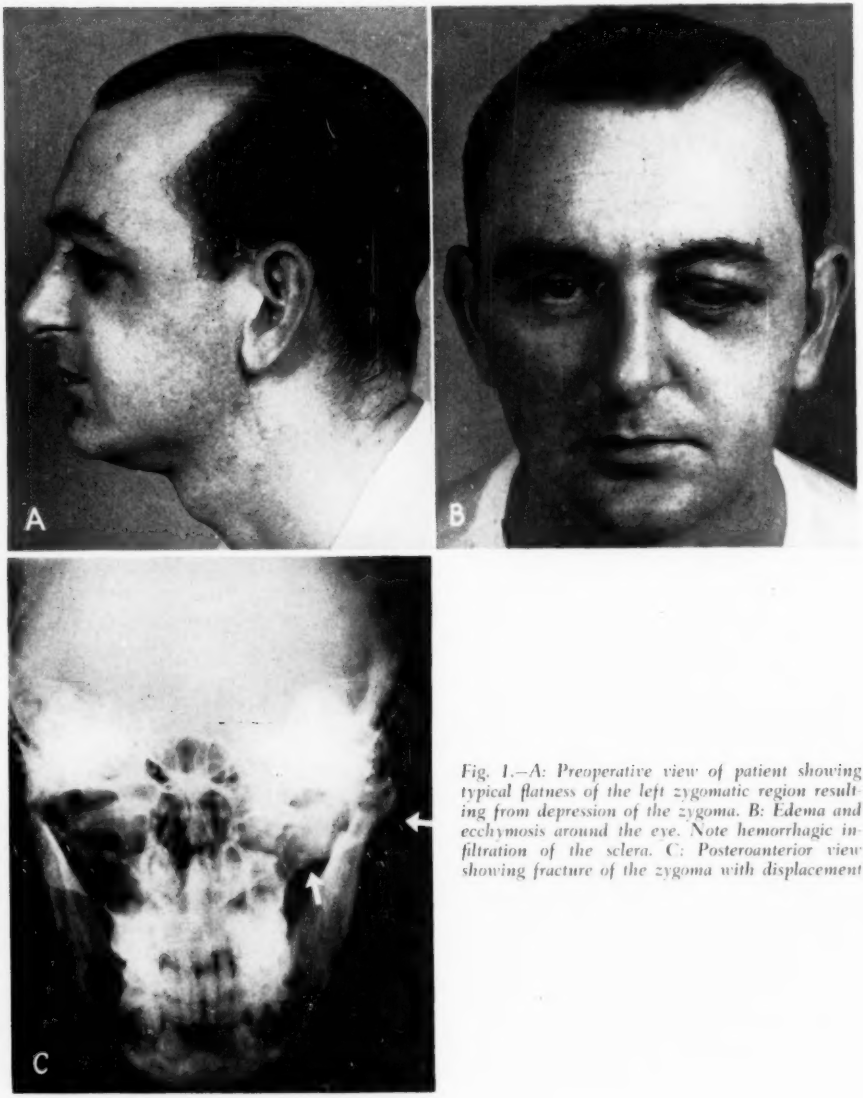

Fig. 1.—A: Preoperative view of patient showing typical flatness of the left zygomatic region resulting from depression of the zygoma. B: Edema and ecchymosis around the eye. Note hemorrhagic infiltration of the sclera. C: Posteroanterior view showing fracture of the zygoma with displacement

zygomatic arch against the coronoid process) and pain.

4. Ecchymosis
5. Unilateral nasal hemorrhage.
6. Infraorbital anesthesia.
7. Diplopia.
8. Emphysema.[1]

The roentgenographic examination should consist of posteroanterior and verticosubmental views which give the clearest view of the maxilla and demonstrate well the position of the two inferior orbital margins, with the degree of displacement.

There are several methods of treatment. Among those are the following:

1. The intraoral approach through the buccal fold.[2,3,4]
2. The external approach.[5-8]
3. The antral approach.[9,10]

There are certain advantages and disadvantages to any given operative procedure. I prefer to elevate the displaced bone through a small incision in the cheek. The place of incision is made according to displacement of the bone.

If the zygoma is badly comminuted,

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10. Lothrop, H. A., Fractures of the Superior Maxillary Bone Caused by Direct Blows Over the Malar Bone: A Method for the Treatment of Such Fractures. *Boston M. & S. J.* **154**:8 (Jan. 4) 1906.

Fig. 2.—Steel hook showing grasp for hand and fingers

Fig. 3.—A: Postoperative view of patient showing small external skin incision. B: Posteroanterior view showing zygoma in correct alignment. C: Appearance of patient when dismissed from hospital February 15

a steel hook will usually prove unsatisfactory for elevation of these fragments, and an intraoral incision with elevation from within the antral cavity may be necessary.

The final decision as to the method of treatment used must be determined by the experience of the operator, and the nature of the injury.

■ *Report of Case*

A white male, aged 27, was admitted to the hospital January 23, 1950, after falling 20 feet from the roof of his home two days previously.

The left cheek bone had struck a wooden saw horse in the fall. The patient was not aware of any facial deformity until some of the swelling around his eye had subsided, at which time he noticed a depression around his left eye.

The patient's general physical condition was within normal limits. There was decided flatness of the left side of the face (Fig. 1, *A*). The infraorbital region was numb and tingling.

Limitation of mandibular movements was not evident, and the occlusion of the teeth was normal. The patient complained of pain in the zygomatic region.

There was edema and ecchymosis of the left eyelid with subconjunctival hemorrhage (Fig. 1, *B*).

The left eyelids were swollen. Vision was unimpaired and diplopia was not evident. There were no lacerations over the malar prominence.

Roentgenographic examination revealed a fracture involving the left zygoma in the region of junction with the maxilla (Fig. 1, *C*). There was also a fracture with some displacement which involved the zygoma on its lateral aspect. The zygomatic arch had a minimum medial displacement.

Fig. 4.—Appearance of patient on April 24, showing results of treatment. Incision is hardly visible

On the second day after admission, under thiopental sodium anesthesia, a small incision was made in the cheek along the lower border of the malar bone. A steel hook with a sharp point (Fig. 2) was inserted, and by making forceful upward and forward traction the bone was elevated into its normal position. No form of external fixation was necessary. Two skin sutures were placed to close the small incision in the cheek (Fig. 3, *A*). The jaws were stabilized by intermaxillary fixation for several days to avoid subsequent displacement by muscular activity.

Roentgenographic examination on January 27 showed excellent anatomic alignment of the fractured zygoma (Fig. 3, *B*).

The displaced bone caused no complications, and healing progressed satisfactorily. The skin sutures were removed on the fourth day.

The patient was dismissed from the hospital February 15. The zygoma had healed solidly in good position, and the result attained was satisfactory (Fig. 3, *C*). There was still slight paresthesia in the infraorbital region, and numbness extended over the left side of the upper lip.

On April 24 the paresthesia in the infraorbital region was no longer present. The incision which had been made in the cheek was hardly visible (Fig. 4). The patient was in good physical condition, and the result appeared entirely satisfactory.

Eradication of gagging reflex for full denture patients

■ *Charles W. Lincoln, D.D.S., Pasadena, Calif.*

Gagging, as experienced by people wearing dentures, is a most distressing condition. Often it is of a temporary nature, lasting from a few hours to a few days. The perseverance and cooperation on the part of the patient play an important part in overcoming the condition. It has been found in most instances that if the patient will wear the denture continuously for a sufficient period of time a tolerance will be built up and the gagging reflex overcome. In some instances, however, there remains a constant lack of tolerance on the part of the patient, in spite of various mechanical aids, such as extending the denture, increasing the postdam pressure, or constructing a palateless denture. In these rare cases, I have resorted to the injection of alcohol and, in all cases, have obtained immediate relief.

The soft tissues overlying the approximate junction of the hard and soft palate are painted with a mixture of one part tincture of iodine and one part tincture of aconite, and the tissues dried by a blast of warm air. As a result of this painting the junction of the hard and soft palate is indicated by the variance in color of the tissues. Now the lesser palatine foramen is located on the posterior margin of the palatine bone. About 0.5 cc. of procaine hydrochloride is injected into the

soft tissues approximately 4 mm. distal to the foramen, on either side. Allowing about one minute for the anesthesia, the denture is inserted to make certain that the gag reflex has been eliminated. Should results prove satisfactory, the denture is removed, and about 10 minims of 190 proof alcohol is injected into the same regions. This causes a slight sensation of fullness in the pharyngeal wall. The effect of the alcohol usually wears off after a few months, and by that time the patient is free of complaints. In one instance the injection was repeated after a period of five months. The effect of the second injection has worn off and the patient is now able to wear dentures comfortably.—65 *North Madison Street.*

The mandibular third molar

■ *P. Philip Gross, D.D.S., Philadelphia*

The Winter classification of the mandibular third molar is based upon the position of the crown of the third molar in relation to the vertical second molar, the deflection of the buccal surface of the third molar to the alignment of the buccal surface of the second molar and the accessibility of the mesial surface of the third molar.

The mandibular third molar is classified as vertical, mesioangular, distoangular and horizontal, according to the position of the crown in relation to the vertical second molar (Fig. 1, *A*).

The vertical type of mandibular third molar is parallel to the crown of the vertical second molar. This type when fully erupted is a normal third molar in the arch (Fig. 1, *B*).

The mesioangular type is inclined anteriorly or mesially. The crown is directed toward the second molar and the roots point toward the ramus (Fig. 1, *C*).

The distoangular type is directed distally, with the crown toward the ramus and the roots toward the second molar (Fig. 1, *D*).

The horizontal type of third molar is at right angles to the second molar. The usual horizontal type lies with the crown toward the second molar (Fig. 1, *E*).

There are variations from the four basic positions described, but are so seldom encountered that they are not included in the main classification.

The crown of the mandibular third molar in either of the four basic positions may be deflected buccally or lingually out of alignment with the buccal surface of the second molar. The buccal surface of

the third molar in relation to the buccal surface of the second molar may be in any of three positions: direct alignment (no deflection), buccal deflection, or lingual deflection.

Where there is direct alignment, the crown of the third molar is directly distal to the crown of the second molar with the buccal surface of the third molar and buccal surface of the second molar in direct alignment (Fig. 2, *A*).

The buccal deflection is that in which the buccal surface of the crown of the mandibular third molar is out of alignment buccally with the corresponding surface of the second molar.

The most common deflection of the mandibular third molar is buccally (Fig. 2, *B*).

In the lingual deflection the buccal surface is deflected lingually. When the buccal surface of the crown is deflected lingually out of alignment with the buccal surface of the second molar, the deflection will have a tendency to direct the occlusal surface of the third molar

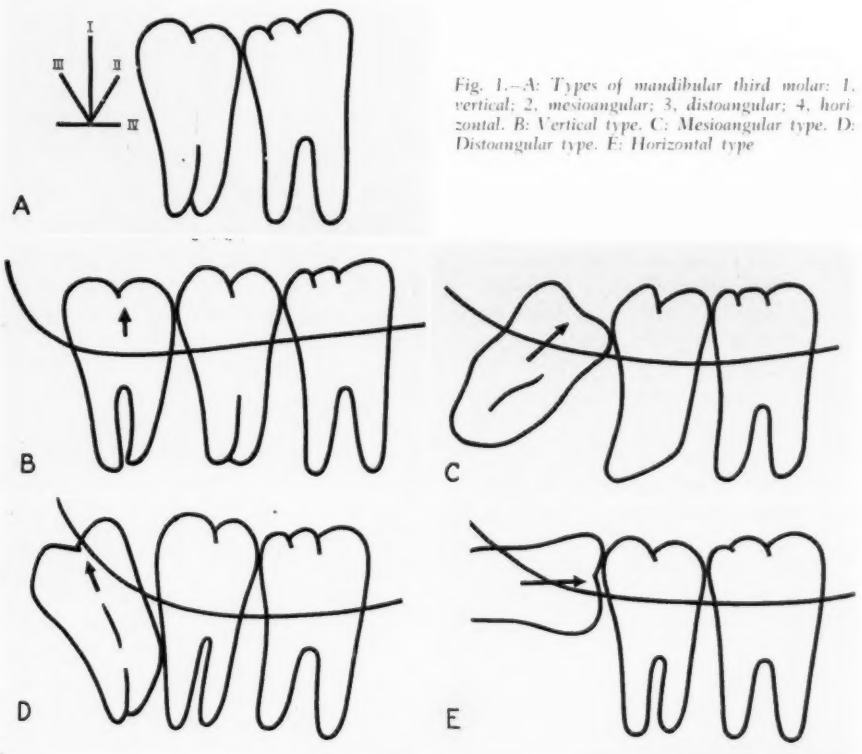


Fig. 1.—A: Types of mandibular third molar: 1, vertical; 2, mesioangular; 3, distoangular; 4, horizontal. B: Vertical type. C: Mesioangular type. D: Distoangular type. E: Horizontal type

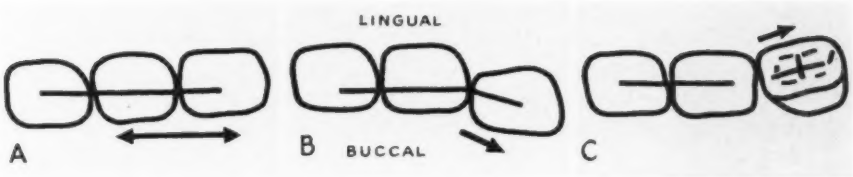


Fig. 2.—A: No deflection, buccal surfaces of second and third molars in direct alignment. B: Buccal deflection. C: Lingual deflection

toward the lingual surface of the arch. The further this buccal surface of the crown of the third molar is deflected lingually from its alignment with the buccal surface of the second molar, the more definitely will the occlusal surface of the third molar be outlined in the lingual roentgenogram (Fig. 2, C).

The alignment of the mesioocclusal portion of the third molar with the occlusal surface of the second molar is determined by drawing a diagnostic straight line distally from the occlusal surfaces of the first and second molars toward the ramus. Variations in the alignment from the line drawn determine the amount of ossistructure covering the third molar. The mesial surface in this type is easily accessible to the application of an exolever (Fig. 3, *A*).

The mesial surface inaccessible type is at an appreciable distance from the occlusal line. This type is inaccessible to the application of an exolever without the excision of the ossistructure (Fig. 3, *B*, *C*, *D* and *E*).

The classification of the mandibular third molar depends upon the interrelationship of the position of the tooth as found in the sagittal plane from the lingual roentgenogram, and the occlusal plane from the occlusal roentgenogram.

The combination of the sagittal basic positions, the accessibility of the tooth and the deflection demonstrate the correct position of the tooth. This preoperative diagnosis cannot be overlooked. Practical experience has shown that the successful removal of the mandibular third molar impacted or otherwise, depends upon correct roentgenographic interpretation and clinical diagnosis, in conjunction with an operative technic applicable to the case at hand. The various positions are shown in Figure 4.

■ *Removal of Mandibular Third Molar*

The removal of an impacted mandibular third molar should be regarded in every sense as a surgical procedure. The removal is accomplished in either of two ways:

1. Removing the ossistructure distal to the third molar, creating a space distal to the third molar to permit the elevation of the tooth into the space created in the line of least resistance.

2. Sectioning of the crown of the third molar and the roots, removing the tooth in sections, creating spaces mesially and distally.

In many cases a combination of both methods may be employed. It does not matter whether the tooth is removed *in toto* or in sections. The ideal operative procedure is to remove the tooth without the destruction of too much ossistructure and without harming the neighboring teeth.

The chief aim in the removal of the ossistructure over the crown of the tooth and the excision of the ossistructure distal to the third molar is to permit the elevation of the tooth in the line of least resistance.

Realizing that the retentive factor in the removal of an impacted tooth is the ossistructure, it remains either to excise enough of the retentive ossistructure and remove the tooth in one piece or to divide the tooth and remove it in sections. The less ossistructure excised, the less pain will follow the removal. In many cases, the tooth can be removed with little excision of the ossistructure, using the sectioning technic.

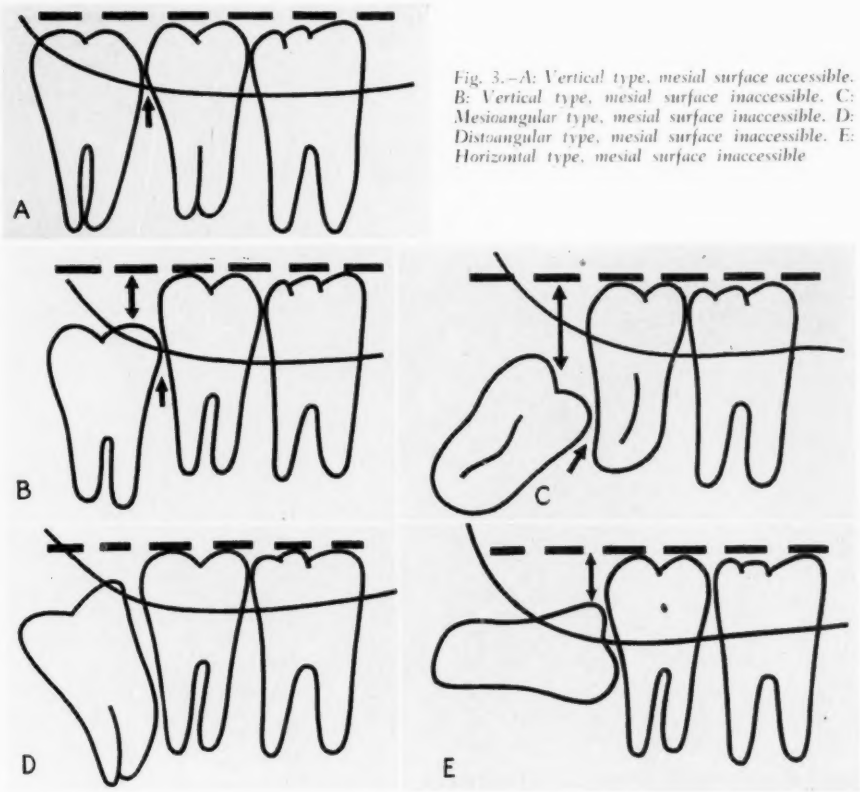


Fig. 3.—A: Vertical type, mesial surface accessible. B: Vertical type, mesial surface inaccessible. C: Mesioangular type, mesial surface inaccessible. D: Distoangular type, mesial surface inaccessible. E: Horizontal type, mesial surface inaccessible

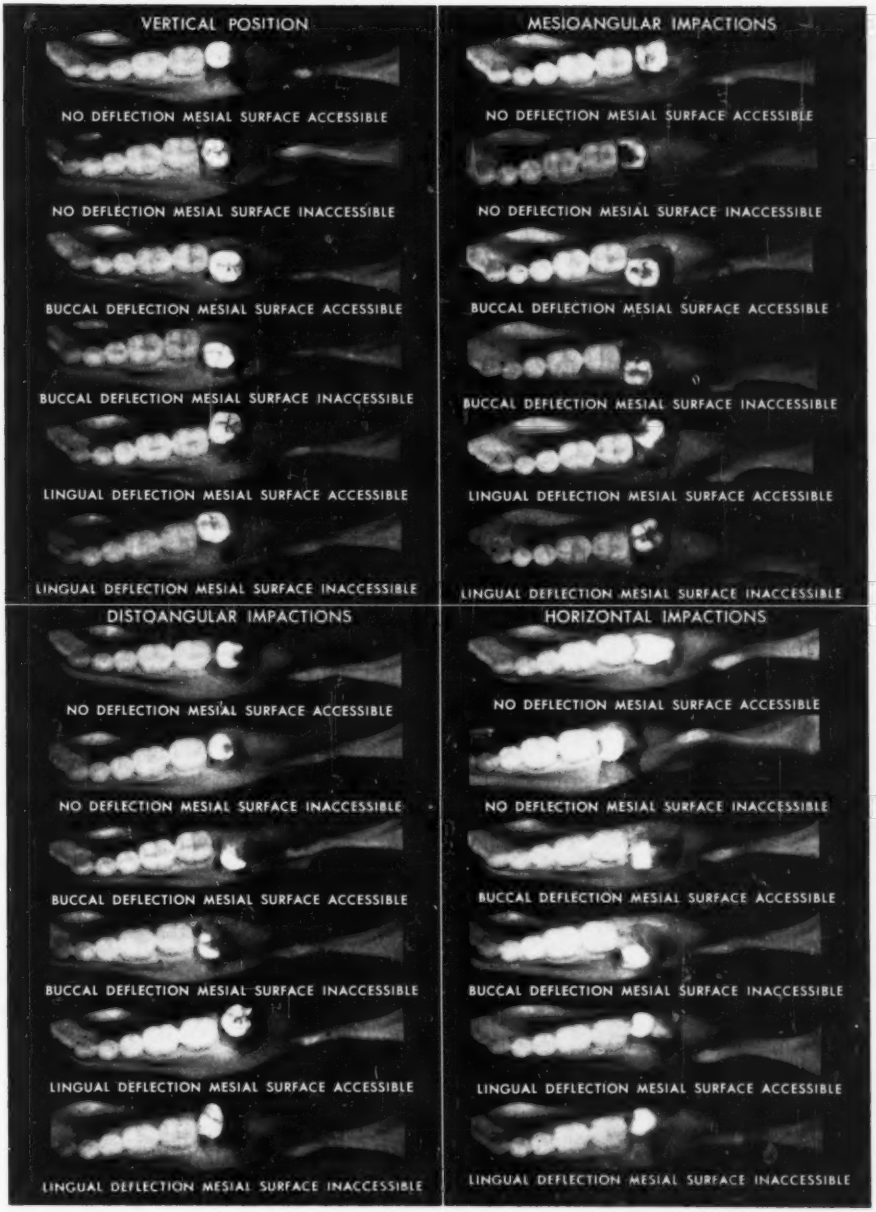


Fig. 4.—Various positions of mandibular third molars—Winter classification

The mucoperiosteal flap is designed to expose the operative region and not to interfere with the lingual tissue. The flap is carefully dissected from around the distal surface of the second molar. The gingival tissue on the distal and the buccal surfaces of the second molar is included in the flap. The mucoperiosteum is retracted with a periosteal elevator from the ossistructure. Traumatization should be avoided, as this tissue flap when replaced forms the protection for the ossistructure, the second molar and the socket after removal of the tooth.

After retraction of the mucoperiosteal flap, the tooth may or may not be covered with ossistructure. It is impossible to state preoperatively, on the basis of a roentgenogram, whether or not the tooth is completely covered with ossistructure.

Any ossistructure over the crown is excised by such means as the ossisector, hand chisel, bone drills or impactor, exposing completely the occlusal surface of the tooth.

Tooth division is accomplished after the ossistructure over the crown is removed. No attempt should be made to elevate the tooth before sectioning. A loose tooth cannot be sectioned easily. The use of the impactor or the automatic chisel has made the sectioning of teeth extremely easy.

The mandibular third molars are sectioned in the following ways:

1. Sectioning of the distoocclusal portion of the crown to create a space for distal displacement of the tooth in conformity with root inclinations. This is used in cases where the mesioocclusal portion of the third molar will not injure the distal surface of the second molar during elevation of the third molar (Fig. 5, *A*).

2. Sectioning of the mesioocclusal portion of the third molar. This procedure is used where the convexity of the distal portion of the second molar will prevent elevation of the third molar (Fig. 5, *B*).

3. Sectioning through the long axis of the tooth, dividing the roots of the tooth longitudinally. This is accomplished by placing the bibevel chisel on the buccal groove (Fig. 5, *C*).

4. Sectioning of the third molar transversely, separating the crown from the roots. This is rather difficult owing to the absence of grooves. This can be overcome by creating a groove at the cervical portion of the tooth. The bibevel chisel can be placed in the notch and the tooth sectioned (Fig. 5, *D*).

■ *Distoocclusal Section Technic*

Case 1 shows the vertical type of mandibular third molar, with lingual deflection, mesial surface accessible, mesial root inclined distally and the distal root straight. The distoocclusal portion of the crown is covered with ossistructure (Fig. 6, *A*).

Sectioning of the distoocclusal portion of the crown permits displacement of the third molar distally in conformity with the root formation (Fig. 6, B).

The socket after the tooth is removed is shown in Figure 6, C.

Case 2 illustrates the vertical type of mandibular third molar, with buccal deflection, mesial surface accessible and both roots inclined distally. The distoocclusal portion of the crown is covered with ossistrucure (Fig. 6, *D*).

Sectioning of the distoocclusal portion of the crown of the third molar per-

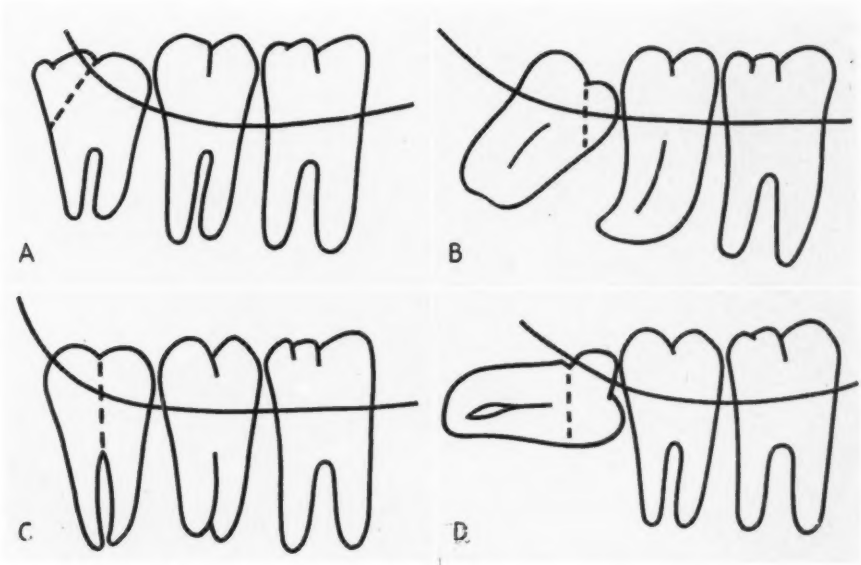


Fig. 5.—A: Sectioning distoocclusal portion of third molar. B: Sectioning mesiooccIusal portion of third molar. C: Longitudinal sectioning of third molar. D: Transverse sectioning of third molar

mits the displacement of the third molar distally in conformity with the root formation (Fig. 6, *E*).

The socket after the tooth is removed is shown in Figure 6, *F*.

The vertical type of mandibular third molar, with no deflection and mesial surface accessible, is shown in Case 3. The crown is not in occlusal alignment and both roots are straight. The distoocclusal part of the crown is covered with ossistructure (Fig. 6, *G*).

The distoocclusal portion of the crown is sectioned and removed (Fig. 6, *H*).

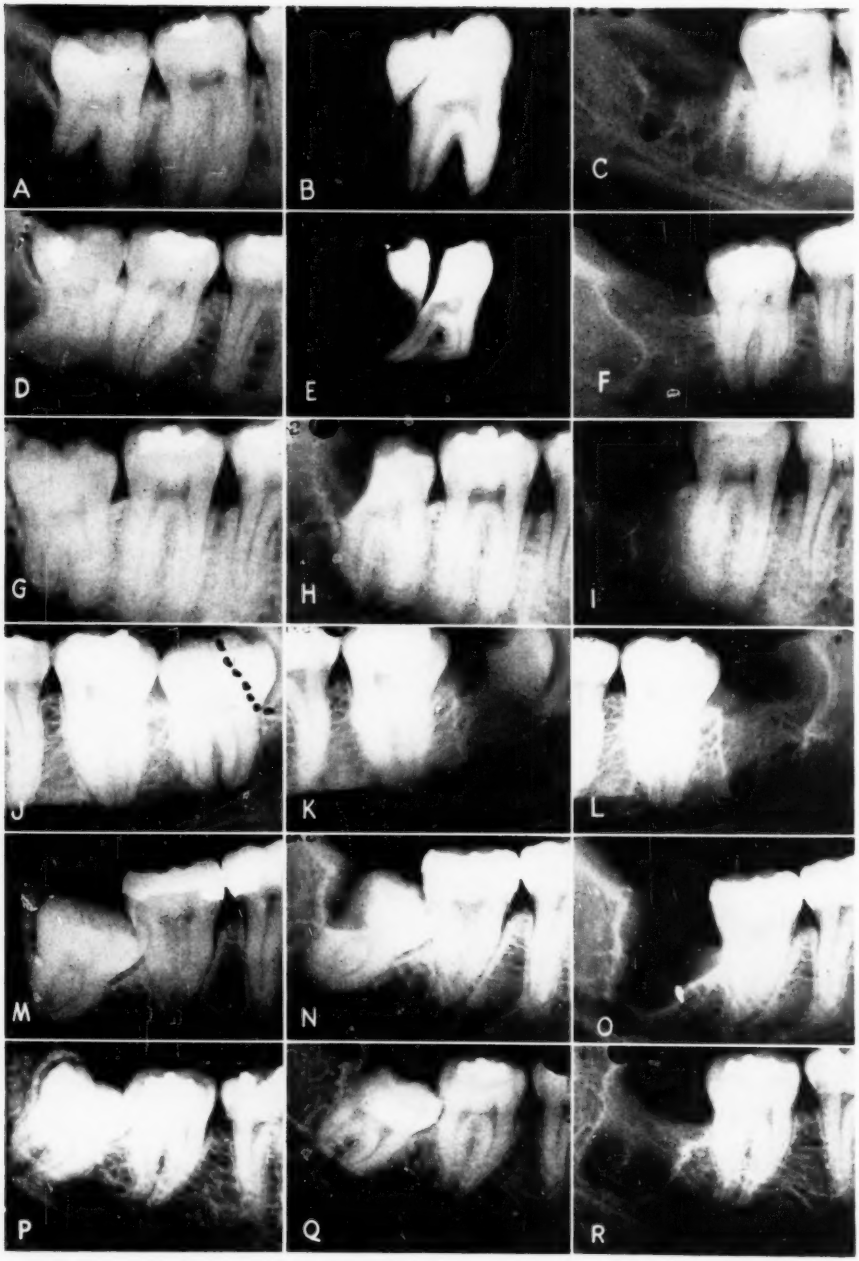
A roentgenogram of the socket after the tooth is removed is shown in Figure 6, *I*.

Case 4 illustrates the vertical type of mandibular third molar, with no deflection, mesial surface accessible, mesial root inclined distally and the distal root inclined mesially. The crown of the tooth is covered with ossistructure with the exception of the mesial cusp (Fig. 6, *J*).

The distoócclusal portion of the crown is sectioned and separated from the tooth. The mesial portion is grasped with a thin beaked forceps and removed, leaving the distoocclusal portion of the crown (Fig. 6, *K*).

The socket after the tooth is removed is shown in a roentgenogram (Fig. 6, *L*).

Case 5 illustrates the mesioangular type of mandibular third molar, with buccolingual deflection, mesial surface inac-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cessible, roots fused and tooth conical in shape. The distoocclusal portion of the tooth is covered with ossistructure. The second molar is also conical in shape (Fig. 6, *M*).

The distoocclusal portion of the third molar is sectioned and removed (Fig. 6, *N*).

The third molar is displaced out of the socket distally in the space created distal to the crown.

The socket after the tooth is removed is shown in Figure 6, *O*.

Case 6 illustrates the mesioangular type of mandibular third molar, with buccal deflection, mesial surface inaccessible, mesial root inclined distally and the distal root straight. The distoocclusal portion of the third molar is covered with ossistructure (Fig. 6, *P*).

The distoocclusal portion of the tooth is sectioned. Removal of the distoocclusal portion creates a space for elevation of the remaining portion (Fig. 6, *Q*). The tooth is deflected buccally and can be elevated into the space created without injury to the second molar.

A roentgenogram of the socket after removal of the tooth is shown in Figure 6, *R*.

■ *Mesioocclusal Section Technic*

Case 7 illustrates the mesioangular type of mandibular third molar, with no deflection, mesial surface accessible, roots fused and conical in shape. The convexity of the distal surface of the second molar prevents the elevation of the third molar distally without injury to the second molar (Fig. 7, *A*). The first molar is absent.

The messioocclusal portion of the third molar is sectioned and removed (Fig. 7, *B*).

With no impinging ossistructure on the distal surface of the third molar down to the gingival margin, the tooth is displaced and elevated out of the socket (Fig. 7, *C*).

Case 8 illustrates the vertical type of mandibular third molar, with no deflection and the mesial surface inaccessible. The mesial and distal roots are inclined distally, the roots are fused, and the bifurcation lies near the apex. The ossistructure covers the distoocclusal portion of the third molar (Fig. 7, *D*).

The mesioocclusal portion of the third molar is sectioned. The removal of this portion creates a space distal to the second molar (Fig. 7, *E*). The tooth is then elevated into the space created mesially (Fig. 7, *F*).

During the elevation procedure the distoocclusal portion of the crown was fractured. The roots were then removed. The point of the exolever was broken during the procedure (Fig. 7, *G*). The case demonstrates the advisability of postoperative roentgenograms.

Figure 7, *H* is a roentgenogram of

Fig. 6.—(Opposite page) A, B, C: Case 1 showing vertical type of mandibular third molar, lingual deflection. D, E, F: Case 2, vertical type, buccal deflection. G, H, I: Case 3, vertical type, no deflection. J, K, L: Case 4, vertical type, no deflection. M, N, O: Case 5, mesioangular type, buccolingual deflection. P, Q, R: Case 6, mesioangular type, buccal deflection

the region after removal of the third molar and the broken point of the exolever.

■ *Longitudinal Section Technic*

Case 9 illustrates the vertical type of mandibular third molar, with buccal deflection, mesial surface accessible, mesial root inclined distally and the distal root straight. The ossistructure covers the distoocclusal portion of the third molar (Fig. 8, *A*).

The tooth is sectioned longitudinally, thus dividing the tooth into two sections. The roots are removed separately.

Roentgenograms of tooth and socket after the operative procedure are shown in Figure 8, *B*.

Case 10 illustrates the mesioangular type of mandibular third molar, with no deflection, mesial surface inaccessible, mesial root inclined distally and the distal root inclined mesially. No ossistructure covers the distoocclusal portion of the third molar (Fig. 8, *C*).

The tooth is sectioned longitudinally and the complete distal root is elevated out of the socket. The roentgenogram shows the distal root removed (Fig. 8, *D*).

The exolever channel is from the superior aspect of the ossistructure to the mesial surface of the mandibular third molar. Figure 8, *E* shows the socket after the mesial root is removed.

Case 11 illustrates the horizontal type of mandibular third molar, with no deflection and the mesial surface inac-

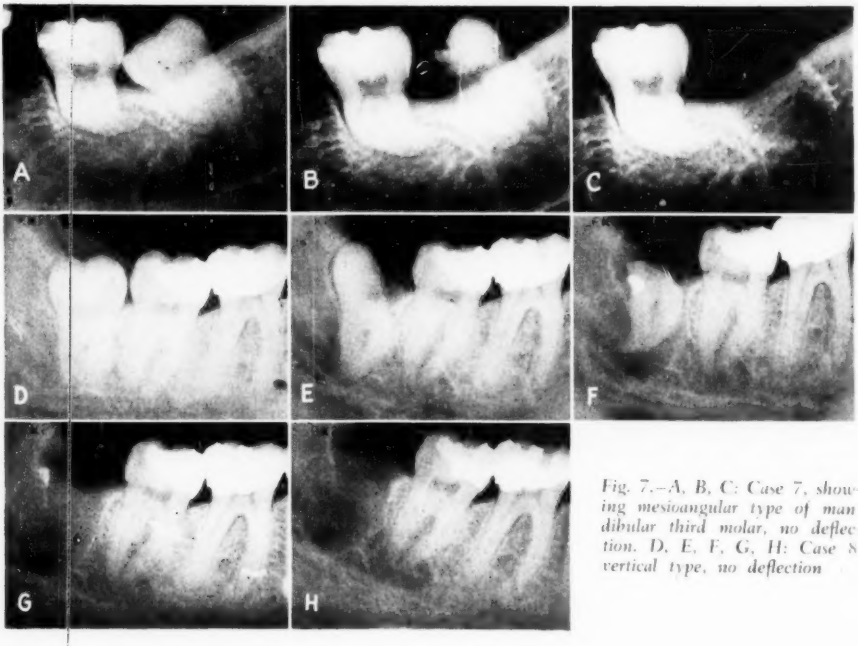
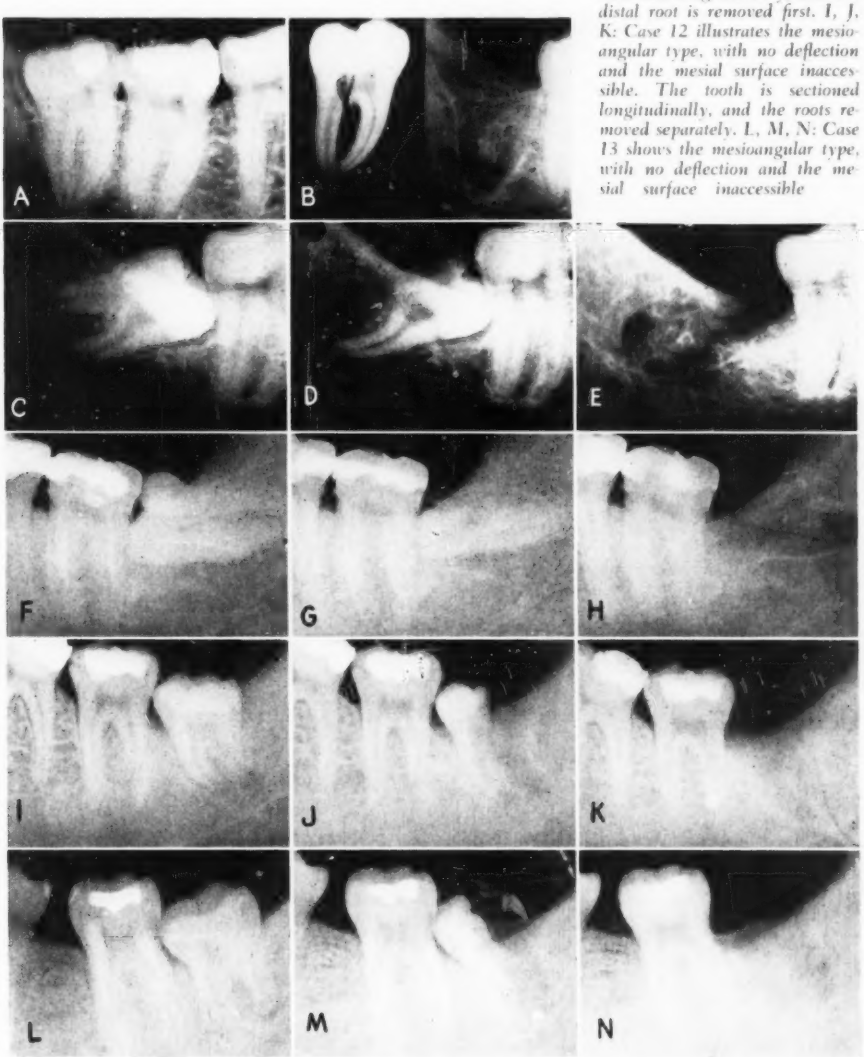


Fig. 7.—A, B, C: Case 7, showing mesioangular type of mandibular third molar, no deflection. D, E, F, G, H: Case 8, vertical type, no deflection

Fig. 8.—A, B: Case 9 illustrates the vertical type of mandibular third molar, with buccal deflection, mesial surface accessible, mesial root inclined distally and the distal root straight. The tooth is sectioned longitudinally, and the roots removed separately. C, D, E: Case 10 illustrates the mesioangular type, with no deflection, mesial root inclined distally and the distal root inclined mesially. The tooth is sectioned longitudinally, and the roots removed separately. F, G, H: Case 11 illustrates the horizontal type, with no deflection. The mesioocclusal portion is wedged under the distal surface of the second molar. The tooth is sectioned longitudinally, and the distal root is removed first. I, J, K: Case 12 illustrates the mesioangular type, with no deflection and the mesial surface inaccessible. The tooth is sectioned longitudinally, and the roots removed separately. L, M, N: Case 13 shows the mesioangular type, with no deflection and the mesial surface inaccessible



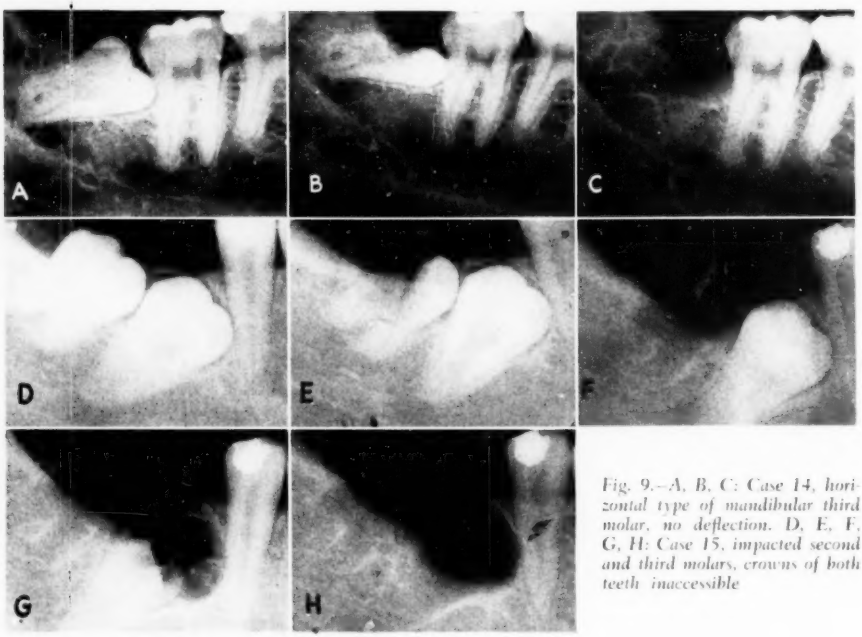


Fig. 9.—A, B, C: Case 14, horizontal type of mandibular third molar, no deflection. D, E, F, G, H: Case 15, impacted second and third molars, crowns of both teeth inaccessible

cessible. The mesiooccłusal portion of the third molar is wedged under the distal surface of the second molar (Fig. 8, *F*). The tooth is sectioned longitudinally and the distal root is removed first (Fig. 8, *G*).

The lingual plate was fractured during the operative procedure, but healed without any complications (Fig. 8, *H*).

Case 12 illustrates the mesioangular type of mandibular third molar, with no deflection and the mesial surface inaccessible. The roots are not fully developed (Fig. 8, *I*). The tooth is sectioned longitudinally and removed (Fig. 8, *J* and *K*).

Case 13 illustrates the mesioangular type of mandibular third molar, with no deflection and the mesial surface inaccessible. The mesial root is inclined distally and the distal root is inclined mesially (Fig. 8, *L*). The tooth is sectioned longitudinally and removed (Fig. 8, *M* and *N*).

■ *Transverse Section Technic*

Case 14 illustrates the horizontal type of mandibular third molar, with no deflection, mesial surface inaccessible and both roots inclined mesially. No ossistructure covers the distooccłusal portion of the tooth (Fig. 9, *A*).

A section of the tooth is removed transversely (Fig. 9, *B*). The crown is completely removed. The root portion is now displaced into the space created mesially. The socket after the tooth is removed is shown in Figure 9, *C*.

Case 15 illustrates impacted mandib-

ular third and second molars (Fig. 9, *D*). The third molar was first sectioned and removed, providing access to the second molar (Fig. 9, *E* and *F*). The crown of the second molar is sectioned and removed (Fig. 9, *G*). This is followed by removal of the roots (Fig. 9, *H*).

■ *Conclusions*

This paper presents a basic classification for impacted mandibular third molars and methods of tooth division. The sectioning of the tooth causes little loss of ossistructure, whereas removing portions of the surrounding ossistructure to deliver the tooth *in toto* results in destroyed structure that must be regenerated.

Where it is possible to remove a tooth in sections, the surrounding ossistructure can often be allowed to remain intact.

The tooth sectioning technic conserves the time of the operator and contributes to the welfare of the patient.

It is for the operator to decide from roentgenographic studies which procedure or which combination is most advantageous to the patient for postoperative healing and comfort.

Sometimes a combination of both ossistructure removal and tooth sectioning has been found most advantageous. Sectioning of the mandibular third molar must never be overlooked as a possible valuable adjunct in this type of oral surgery.—*6740 Torresdale Avenue.*

■ Evidence

The wish that anything may be true, powerfully influences the mind toward finding it true. A researcher in pure science is usually far less influenced by prejudices and wishes than is the investigator who is aware of the practical results of his findings. Even the pure scientist is, however, likely to be prejudiced in favor of a theory that he himself was proposed or espoused. His reputation depends upon its being verified, hence, in his selection of facts and interpretation of results, he is unconsciously prejudiced. This tendency to error has, however a natural corrective. Other scientists may make their reputation by finding defects in old theories and in proving new ones. It has now become a recognized principle that evidence of the truth of a theory presented by one man cannot be accepted as reliable, even as to the facts given in its support, until others have made the same observations and experiments with the same results. This is especially required when the facts reported seem not in harmony with well established theories.—*Edwin A. Kirkpatrick, Journal of the International College of Surgeons 15:175, February, 1951.*

Odontoma of the maxillary sinus

■ *Merritte M. Maxwell, D.D.S., Annapolis, Md., and C. H. Blackstone, D.D.S., Pearl Harbor, Hawaii*

The oral cavity and adjacent structures are formed by a complex embryological process. Because of the complexity of this process, the mouth has a potential for tumor formation which is equal to or greater than any other part of the body.

Odontoma is a tumor of odontogenic origin which, because of its insidious onset, may reach massive proportions before it is diagnosed. The most common symptom of this tumor is painless swelling of the maxilla or the mandible, unless this lesion by encroachment upon adjacent anatomic structures produces inflammation with its sequelae. Rarely does such functional inflammatory impairment occur even though the expansive growth of odontoma may distort alveolar ridges, involve the maxillary antrums, elevate the orbital floor producing diplopia, or partially obstruct the nasal fossae.

Odontoma is so closely allied with all odontogenic tumors that it is difficult to consider any classification which does not include all neoplasms which originate from dental tissue. Bernier and Ash[1] state that

> The term odontoma has been so loosely used in the past, sometimes even to designate simple anomalies and dental cysts, that it has ceased to have the implications it should. Since odontogenic structures normally produce calcified tissues, a large percentage of odontomas contain hard tissue; indeed, soft odontomas, either simple or mixed, are rare. The calcified tissue may be either ectodermal or mesodermal and is usually distorted by dystropic changes. The following classification of odontogenic tumors, while not infallible, has been found workable . . .
>
> A—Ectodermal
> 1. Ameloblastoma
> (a) Monocystic
> (b) Polycystic
> 2. Enameloma
>
> B—Mesodermal
> 1. Soft odontoma
> (a) Fibrous
> (b) Sarcomatous
> 2. Calcified odontoma
> (a) Dentinoma
> (b) Cementoma
>
> C—Mixed (ectodermal and mesodermal)
> 1. Soft mixed odontoma
> (a) Fibro-ameloblastic variant
> 2. Calcified mixed (composite odontoma)
> (a) Complex odontoma
> (b) Compound odontoma
> (c) Geminated odontoma
> (d) Cystic odontoma

This classification is based on the predominate tissue as seen on histologic study. Odontoma represents one or more types of odontogenic tissue, in any given phase of its maturation process at the time the neoplastic activity is instituted. As in all tumors, there is an undifferentiation and proliferation of cells thereafter. This

Captain (D. C.) U. S. Navy, stationed at Severn River Naval Command, Annapolis, Md.

Commander (D. C.) U. S. Navy, stationed at U. S. Naval Dental Clinic, Pearl Harbor, Hawaii.

1. Bernier, Joseph L., and Ash, J. E., *Atlas of Dental and Oral Pathology*, ed. 4. Washington, D. C.: Registry Press, 1948.

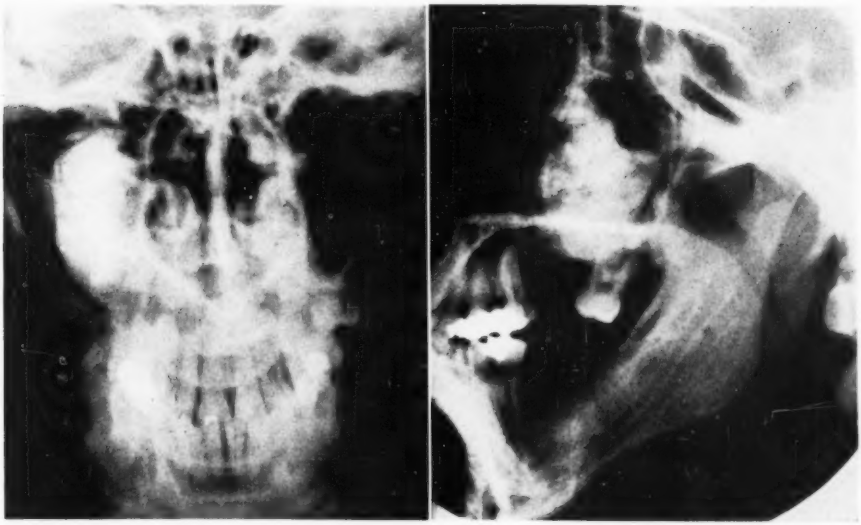


Fig. 1.—Left: Posteroanterior view, revealing radiopaque mass in right maxillary sinus. Note molar tooth in superior aspect of tumor mass. Right: Lateral view, revealing proximity of tumor to the floor of the orbit

undifferentiated tissue then, regardless of type, becomes the tissue from which the odontoma is further classified.

The case reported here is a complex odontoma which is one of the four types of calcified mixed odontomas. The calcified mixed odontomas are benign tumors; further classification is of academic interest, but from a practical standpoint, the treatment, which is excision, is the same for all.

There has been such intensive study of these tumors by some authors which has resulted in minute classification that those with lesser histopathological knowledge may have difficulty at times with the basic questions a surgeon should ask himself when treating any oral pathologic condition. These questions are: (1) Is the lesion inflammatory or neoplastic? (2) If it is neoplastic, is it benign or malignant? Obviously an accurate preoperative diagnosis even with biopsy is not infallible. But a sound approach has been made to definitive treatment if an answer to these questions has at least been searched for prior to institution of definitive treatment.

The complex odontoma may have an associated malignant tumor or a malignant element superimposed over the benign lesion. Therefore, histopathological study of the gross specimen is always indicated.

■ *Report of Case*

A 20 year old white male reported to the clinic with a moderate enlargement

of the buccal surface of the right maxillary tuberosity. Otherwise, the clinical examination of the mouth and adjacent areas was noncontributory. Roentgenographic examination revealed a large radiopaque area in the region of the right maxillary tuberosity, which almost obliterated the antrum (Fig. 1). Physical examination was entirely negative. Blood pressure was 118/68; pulse was 84. A tentative diagnosis of odontoma was made. Penicillin, 300,000 units daily, was administered intramuscularly for two days preoperatively.

On August 17, under block anesthesia of the second division, with procaine, a large flap extending from the tuberosity and over the right maxillary ridge to the upper bicuspid region was retracted. An opening through the lateral wall of the antrum was made, and the tumor dissected free in six large segments. The character of the tissue was extremely dense and was believed to be made up of odontogenic as well as osteogenic tissue. A maxillary molar tooth was embedded in the mass, which extended well up to the floor of the orbit. One of the large segments of the tumor seemed to contain another molar tooth surrounded by bone and the epithelial follicle. Iodoform petrolatum gauze was packed into the cavity and the flap was sutured in place. The tissue was sent to the laboratory for histopathological study.

Penicillin therapy was continued for two days postoperatively.

In the best interest of the patient, it

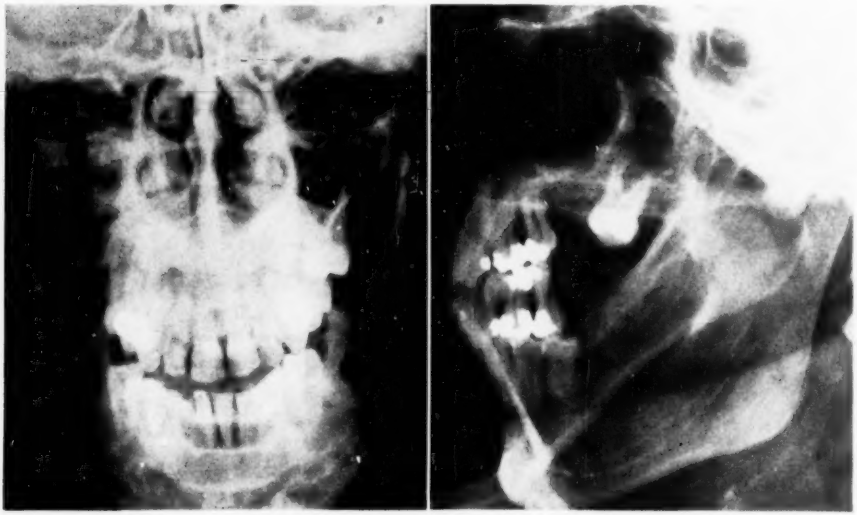


Fig. 2.—Left: Posteroanterior view, taken postoperatively, showing a normal roentgenographic picture of the sinus except for operative defect in the lateral wall. Right: Lateral view.

was felt that it was advisable to hospitalize him for better control of his general postoperative care. A small portion of the iodoform pack was to be removed daily, after which a drain was inserted and changed every third day. His course during hospitalization was uneventful.

The laboratory reported a diagnosis of complex odontoma.

On August 27, 1949, the patient was discharged to duty and instructed to report to the clinic for outpatient care, which consisted of observation and maintaining drainage through the operative site.

On September 23, 1949, a roentgenographic survey was made. This examination revealed a diffuse clouding of the right antrum. The postoperative condition was satisfactory.

On October 10, roentgenograms revealed a decreased cloudiness of the right antrum. On February 27, 1950, roentgenograms of the operative site revealed normal radiolucency of the right antrum (Fig. 2).

■ *Comment*

The operative site healed completely. There have not been any clinical symptoms which suggest an infectious process or recurrence of the tumor.

Long-standing dislocation of the jaw

■ *Otto Gottlieb, M.D., Copenhagen, Denmark*

In this paper, dislocation of the jaw is taken to mean forward dislocation, be it unilateral or bilateral. This is the most common form, and lateral and medial dislocations, as well as those projecting backwards into the external auditory canal, often combined with mandibular fracture, are not discussed.

Dislocation of the jaw is caused by forced opening of the mouth—usually bilateral—or by a blow on the mandible—usually unilateral. In both cases the condyle or condyles are displaced forward, below and in front of the articular tubercle, where it becomes fixed by muscle spasm or tension in the ligaments and joint capsule. Normally, this fixation is not owing to the coronoid process being wedged into the anterior and inferior surface of the zygomatic bone as stated by

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many before roentgen rays were available.[1,2] Roentgenograms never show such contact.

Unlike dislocations of other joints, tearing of the capsule is rare in dislocation of the jaw. Detachment of the interarticular disk is seldom seen, but it may occur and is probably responsible for the majority of irreducible dislocations of the jaw which call for open reduction, often involving removal of the disk.[3,4]

Long-standing dislocations of the jaw are often caused by slight injuries, such as extraction of teeth, the taking of impressions, or merely by inspection of the oral cavity, since the patient's attention is fixed on something other than the movement of opening the mouth. Dislocation may occur during general anesthesia.

Often the dislocation is not noticed, and a patient may not seek medical advice until weeks or months after the injury. Sometimes a doctor is unable to make the diagnosis, either because the patient is edentulous or because some degree of mobility—nearthrosis—has developed in the dislocated joint. In some of the cases reported in the literature the patients have managed with a dislocated mandible, but the masticatory function is always poor.[2,5-8] In most cases, however, dislocation of the jaw is extremely uncomfortable, particularly when it is bilateral with the mandible fixed so that the mouth is open, preventing masticatory function and causing pain, salivation and difficulty of speech. Although a fair function may be found in unilateral cases,[9] there is always limitation of motion, malocclusion, and deviation of the chin away from the affected side, producing asymmetry of the face.

■ *Methods of Reduction*

Long-standing dislocations have always presented problems, and the patients were not always left untreated in the hope that an applicable nearthrosis would form. Numerous methods of reduction have been suggested, manual as well as instrumental.

1. The method most commonly used and recommended of standing in front of the patient with the thumbs on the molar regions and pressing the mandible downwards and backwards is seldom of any avail in long-standing cases.

2. A better hold is obtained by standing behind the recumbent and preferably anesthetized patient, forcing the mandible downwards and backwards by pressure on the molar region.[9]

3. Hippocrates[10] recommended that the chin be pulled further down from the dislocated position and the mandible pressed horizontally backwards.

4. Guiglelmo da Saliceto and later Ambroise Paré[11] recommended the wedge method, which later has been used by

1. Lejars, F., *Technik dringlicher Operationen*, ed. 3. Jena: Gustav Fischer, 1902, p. 897.

2. Malgaigne, J.-F., *Traité des fractures et des luxations*. Paris, 1855, vol. 2, p. 288-318.

3. Ameline, A., and Aubry, M., Sur une luxation irreductible de la machoire inferieure. *Mém. Acad. de Chir. Paris* 72:504, 1946.

4. Dufourmentel, L., *Chirurgie de l'articulation temporo-maxillaire*, ed. 1. Paris: Masson et Cie, 1929, p. 128.

5. Blair, V. P., and Ivy, R. H., *Essentials of Oral Surgery*, ed. 3. St. Louis: The C. V. Mosby Company, 1944, p. 216.

6. Bloch, Oscar, *Chirurgien i kliniske forelesninger*. Copenhagen: Gyldendalske, 1906, p. 757.

7. Jones, J. C. B., Treatment of Unreduced Bilateral Forward Dislocation of the Temporo-mandibular Joint. *Brit. D. J.* 86:275 (June 3) 1949.

8. Perthes, G., and Borchers, E., *Verletzungen und Krankheiten der Kiefer*, ed. 2. Stuttgart: Ferdinand Enke, 1932, p. 133.

9. Borchers, Eduard, *Allgemeine und spezielle Chirurgie des Kopfes*. Berlin, 1926, p. 259.

10. Stimson, L., *Fractures and Dislocations*. New York, 1899, p. 467.

11. Paré, A., *Les oeuvres d'Ambroise Paré*, ed. 9. Lyon, 1633, p. 417.

Cooper[12] in a dislocation of 35 days' standing, and Berg[13] in a dislocation of two months' standing. This method consists of placing plugs of wood or cork in the molar regions. Then the chin is elevated, either manually or by means of an elaborate pulley passing up over a headgear down to the shoulders. This has a violent effect on the mandible, the condyles being pulled from the skull and pressed down under the articular tubercles.

5. A similar principle underlies the screw forceps designed by Stromeyer,[8] used in a dislocation of 35 days' standing, and later used with success by May[8] in a dislocation of 33 days' standing, and Bouisson[14] in a dislocation of two months' standing. By means of a pair of forceps with horseshoe-shaped jaws fitting the rows of teeth, the teeth were pressed apart, whereupon the reduction proper was reported to be fairly easy.

6. McGraw[15] introduced a method which approaches open reduction. He designed a strong steel hook which he inserted, through a small skin incision, under the zygomatic arch, seized the neck of the mandible, and reduced one side at a time. The same method has been used by Hildebrandt,[16] Fink[8] and Schattenkerk.[17]

Bloch[6] mentions manual reduction in the following long-standing cases: Physick (several weeks), Herth (80 days), Donovan (95 days), Bird (4½ months).

Perthes[8] has quoted similar cases: Spät (58 days), Richard (47 days), Hutchinson (60 days), Demarquay (98 days), Nelaton (114 days), Pollock (120 days), Micha and Gosselin (130 days).

In the literature, I have found only 3 cases of long-standing dislocation of the jaw reduced by manual methods: Müller[18] (3 months), Berg[13] (2 months), Bouisson[14] (2 months).

None of these cases was controlled by roentgenographic examination, and there may, therefore, have been a question of subluxations, since in cases of true dislocations such pronounced adhesions and connective tissue accumulations develop in the joint cavity that actual reduction is impossible, and violent manipulations may lead to ankylosis.

On the whole, it is wise to abstain from violent methods of reduction.

It cannot be ruled out that part of the apparent reductions were due to fractures of the neck of the mandible. The early cases were not examined roentgenographically, and excellent function may be obtained by a false joint in the neck of the mandible.

Injury to the teeth must not be disregarded. The risk of such injuries is greatest in connection with the wedge method. Bouisson[14] treated a patient for whom four teeth had been fractured during an attempt at reduction. To prevent injury to the teeth, Cooper[12] recommends insertion of cork instead of wooden plugs between the molars. McGraw[15] realized the risk, stating: "How many such teeth have been broken in attempts to reduction does not appear in the records. Probably

12. Cooper, A., *Practice of Surgery*. London: Alexander Lee, 1837, vol. 2, p. 399.

13. Berg, A., Ein Fall einer veralteten, dobbelseitigen Unterkieferverrenkung. *Zeitsch. f. Stomatol.* 24:876, 1926.

14. Bouisson, Über die Reduction einer veralteten Luxation des Unterkiefers. *Der Zahnarzt* 8:91, 1853.

15. McGraw, T., A New Method of Reducing Old Dislocations of the Lower Jaw. *Med. Record* 56:511, 1899.

16. Hildebrand, O., Zur blutigen Reposition veralteter Kieferluxationen. *Archiv f. klin. Chir.* 66:352, 1902.

17. Schattenkerk, J., and Eeftinck, P., Luxatio mandibulae inveterata. *Nederl. Tijdsch. v. Geneesk.* 90:91, 1946.

18. Muller, G. M., Long-standing Dislocation of Mandible. *Brit. M. J.* 1:572 (April 13) 1946.

the surgeons have thought the matter too trivial for mention."

Stimson[10] warns against violent reduction which, in his opinion, predisposes to habitual dislocation because of lengthening or rupture of the ligaments.

If a dislocated jaw cannot be reduced by the simple manual methods 1, 2 and perhaps 3 under general anesthesia, various authors[4,5,9] advocate arthrotomy. If no adhesions are present and the cartilaginous surfaces are smooth, direct reduction may be risked, perhaps after removal of an affected interarticular disk.[3,4,10] In the presence of adhesions and pronounced cartilaginous changes, so common in long-standing cases, the best course is condylar resection as first described in detail for ankylosis of the mandibular joint (König 1878) and used for long-standing dislocations by several authors.[6,9,19,20] Mazzoni (1877) was the first to perform condylectomy for long-standing dislocation of the jaw.[15] The difficulty which may sometimes be connected with deciding which method to use is illustrated by a case reported by Ginestet, Desorthes and Houessou[21] which affords a hint as to which method gives the most satisfactory result.

A bilateral dislocation of the jaw of four months' standing was treated by open reduction. After arthrotomy an instrument was passed between the zygomatic bone and the condyle which was tilted down below the articular tubercle. The primary result was excellent, but at the end of three years total ankylosis had developed. Condylar resection was performed with good results. A follow-up examination years later showed good results.

One method is mentioned mainly as a curiosity; that is, division of the masseter and internal pterygoid muscles.[22,23] In the absence of muscular contractures, this method is entirely superfluous, since the muscular spasm is easily overcome by a correctly administered general anesthesia.

Finally, mention should be made of a case, described by Jones,[7] which was treated surgically by an entirely different principle.

The patient was a boy, aged 16. About 10 years previously tonsillotomy had resulted in bilateral forward dislocation which had never been reduced. Surgery was indicated because of undernourishment due to the poor masticatory function. The occlusion (prognathic deformity) was corrected by osteotomy of both rami, and the result was reported good. Occlusion and masticatory function were satisfactory and the boy gained weight. Evidently, there must have been a fairly good mobility in the nearthrosis in front of the articular tubercle, presumably because the dislocation was sustained at so early an age.

This method could hardly have been applicable in cases of bilateral dislocation in which there was extremely limited motion. Morover, the patient as well as the physician must possess great patience to wait, perhaps for years, before a sufficient mobility is obtained and the malocclusion may be corrected surgically.

Two cases, reported as unreduced

19. Eliason, E., Dislocations. In *Nelson's Loose Leaf Surgery*. New York: Nelson, 1927, vol. 3, p. 195.

20. Kocher, T., *Chirurgische Operationslehre*, ed. 5. Jena: Gustav Fischer, 1907, p. 584.

21. Ginestet, G., Luxation irreductible de la machiore suivie d'ancylose. *Revue de Stomatologie* 49:655, 1948.

22. Kramer, Zur Behandlung der irreponiblen Unterkieferverrenkung. *Centralblatt f. Chir.* 28:269, 1901.

23. Samter, Über blutige Reposition der veralteten irreponiblen Kiefergelenksverrenkung. *Verhandl. der deutschen Gesellschaft f. Chirurgie* (33rd Congr.) 1904.

unilateral dislocation of the jaw[24,25] have doubtless been cases of unilateral hyperplasia of the condyle and are, therefore, not examples of long-standing dislocation.

■ *Report of Cases*

Three cases of long-standing dislocation of the jaw treated at the University Hospital, Copenhagen, department of oral surgery, from October, 1948, to September, 1949, are reported here.

CASE 1—The patient was a female, aged 24. For 18 months, without being aware of any injury, the patient had noticed increasing cracking and pain on moving the left temporomandibular joint, and similar, but milder symptoms in the right joint. The condition was so uncharacteristic that when she entered an ear, nose and throat department in February, 1948, because of maxillary sinusitis, the mandibular lesion was not treated. When admitted to the oral surgery department on October 11, 1948, the patient was greatly disabled by the pain in the left temporomandibular joint. There was a slight malocclusion, the mandible deviating to the right. The patient was unable to move the mandible further to the right, but movement to the left was free. She could open her mouth about 4 cm., during which movement the chin deviated to the left. On palpation, the left condyle was fixed anteriorly and could perform only hinge movements, whereas the right condyle moved normally. There was slight tenderness of the left temporomandibular joint. Roentgenograms showed forward dislocation of the left condyle, but no other bony changes.

Since the lesion was of 18 months' standing, arthrotomy of the left temporomandibular joint was performed, under local procaine-epinephrine analgesia, through a Bockenheimer-Axhausen incision. The appearance of the condyle corresponded to the roentgenographic findings. It was fixed by firm, fibrous adhesions, and the joint cavity was filled with connective tissue. Resection of the condyle was performed. The postoperative course was uneventful.

Dental splints with intermaxillary rubber bands were applied and left in place for four months. A follow-up examination on May 11, 1949, revealed cracking and slight pain in the right temporomandibular joint, but no pain on the left. When the mouth was opened, a maximum of 3 to 4 cm., the mandible tilted upwards on the left, but there was no lateral deviation and the occlusion was normal.

At the end of a year there was slight deviation to the left, but no pain. There was satisfactory masticatory function and appearance was unchanged.

CASE 2—The patient was a male, aged 60. On July 4, 1948, he had consulted his dentist who extracted the last of his teeth, under local analgesia. The dentist planned to make dentures. The patient was told to return, but despite severe pain in the jaw he failed to do so. Even when he discovered that he had developed a prognathic deformity and was unable to close his mouth, he failed to seek expert advice. Somewhat later he consulted a dental technician who made dentures for

24. Flater, A., Ein Fall von nicht reponirter, einseitiger Kieferluxation. *Munch. Med. Wochnschr.* **63**:1154, 1916.

25. Schwartz, M., Unreduced Unilateral Dislocation of the Jaw. *J. Bone & Joint Surg.* **22**:176 (Jan.) 1940.

him, stating merely that the patient was prognathous.

Since the limited mobility persisted and the pain increased, the patient consulted a physician at the end of five months. Roentgenograms showed bilateral dislocation of the temporomandibular joints. Reduction was attempted, under general anesthesia, but without success.

When admitted on March 1, 1949, the mandible could be moved only slightly. The inferior alveolar process was about 1 cm. in front of the superior alveolar process, both of which were edentulous. There was a gap of 2 cm. between the alveolar processes on maximum closing of the mouth. The full dentures fit badly. On palpation, both condyles were anterior to their usual site, where an unmistakable depression was felt. There was no tenderness of the temporomandibular joints.

After an unsuccessful attempt at reduction, arthrotomy of both temporomandibular joints was performed, under lidocaine hydrochloride anesthesia, through incisions in front of the ears. The condyles were dislocated forward, the left one slightly movable, but the right one was firmly fixed. The joint cavities were filled with connective tissue, the disk was barely visible on the left, but could not be discerned on the right. The condyles were affected with destructive changes, and bilateral condylar resection was therefore performed. The postoperative course was uneventful.

When discharged on March 12, the patient had no pain, and the mobility was fairly good. After he had been supplied with dentures, the occlusion was satisfactory and masticatory function painless.

At the end of eight months the patient could open his mouth freely. There was no deviation or pain. The masticatory function, occlusion and appearance were satisfactory.

CASE 3—The patient was a male, aged 62, who on April 27, 1949, consulted a dental technician to have his upper denture repaired. A model was made of the the upper jaw. The patient stated that this had made him uncomfortable, but he had felt no pain. Since then, he had been unable to close his mouth, had difficulty in swallowing, excessive salivation and indistinct speech. He, therefore, again consulted the dental technician who told him not to worry, he would be all right, and that he need not seek medical advice. However, the patient did consult a doctor, but not until a few months later.

On July 15, an attempt at reduction under general anesthesia failed, and because of an intercurrent disease the patient did not seek further treatment until September 12, 1949. On admission, there was typical bilateral forward dislocation of the jaw. He was unable to move the mandible more than 0.5 cm. in the anterior region, and there was a distance of at least 2.5 cm. between the incisors of the badly fitting dentures. On palpation the condyles were found to be displaced forward, leaving a depression at their usual site, but there was no tenderness of the temporomandibular joints.

After an unsuccessful attempt at reduction under general anesthesia, bilateral condylar resection through a Bockenheimer-Axhausen incision was performed on September 20. The operative findings were exactly like those of Case

2. Apart from a pronounced postoperative edema, no complications occurred.

When discharged on September 28, the patient was able to open his mouth about 4 cm. without pain and close the mouth normally; horizontal movement normal. The occlusion was not satisfactory with the dentures. He was advised to have them replaced. At the end of three months he could open his mouth freely and without deviation or pain, the masticatory function was good, the bite remained as previously without retraction of the mandible. The new dentures fit well, opening of the mouth was performed with a pure hinge movement, there was no swelling, the scars were satisfactory. At present there is paresis of the forehead, but the function is returning.

■ *Comments*

Cases 2 and 3 are typical, whereas the unilateral dislocation described in Case 1 should have been preceded by an injury and have presented a more pronounced malocclusion to be typical. However, several authors have reported that unilateral dislocation may exist with applicable function.[2,3,8] Bilateral dislocation, on the other hand, is nearly always accompanied by a poor function, although some cases have been reported in which the patients have got along well for years without any treatment.[2,7]

None of the three cases had sought medical advice early, as the injuries were evidently slight and the condition at the outset not particularly painful. The unilateral case was characterized mainly by pain in the late stages, whereas the two bilateral dislocations were characterized by fixation with the mouth open and the mandible projecting forward. The patients with bilateral dislocations were unable to chew and had to take only fluids. As they could not close their lips, their speech was difficult to understand, and they were bothered by abundant salivation. On the whole, the condition was intolerable. In Cases 2 and 3 manual reduction had been tried, but not by the wedge method. In all three instances, arthrotomy revealed fibrous adhesions and accumulation of connective tissue in the joint cavities, destruction or crumpling up of the disks so far as they could be differentiated, and changes of the articular surfaces of the condyles. Therefore, condylar resection was decided upon in all three cases. In each case the primary functional result was excellent, and there was hardly any change in the appearance as has been feared by some authors.[16] Clearing the joints of connective tissue and open reduction might have resulted in a primarily good occlusion and perhaps satisfactory function for a while, but the risk of ankylosis is considered too high in such cases.[21]

The two patients with bilateral dislocation were edentulous, so it was easy to obtain good occlusion and articulation by means of new dentures. In the case of unilateral dislocation, some difficulty was experienced in obtaining a satisfactory occlusion despite intermaxillary fixation with rubber bands, but selective grinding of the teeth provided good and painless function.

Since this was written, Watanabe[26] has decribed a similar case of unreduced

26. Watanabe, Y., and Otake, M., Unreduced Dislocation of the Mandibular Joint. *Oral Surg., Oral Med., & Oral Path.* 3:1010 (Aug.) 1950.

bilateral dislocation of the jaw with a lapse of half a year following intrapartum eclampsia. It was impossible to reduce the dislocation by manual traction even under general anesthesia, and reduction also failed with an acrylic appliance assisted by a chin retractor. Reduction could be successfully accomplished only by exposure of both condyles and resection of one condyle and both disks.

■ *Conclusion and Summary*

Many previous workers have reported successful reduction of long-standing dislocation of the mandible. When closed reduction has proved unsuccessful, the method of choice is, in my opinion, arthrotomy, which allows one to determine whether open reduction, perhaps combined with removal of the disk, will be sufficient, or whether condylectomy must be performed. Condylectomy is often necessary to prevent ankylosis.

At the department of oral surgery, the University Hospital, Copenhagen, one case of unilateral dislocation and two of bilateral dislocation were seen in the course of one year. Condylectomy was performed in all three. At examinations one year, eight months and three months, respectively, after the operations masticatory function was painless and adequate in all cases, and the appearance of the patients was not changed.

Closure of an antraoral opening by use of the tantalum plate

■ *Clare T. Budge, D.D.S., Denver*

The closure of the maxillary sinus has always been a difficult oral surgery problem. Many operative procedures for the closure of the maxillary sinus following extraction of a tooth have been attempted in the past with good results; however, in most cases, the operative procedures have been most difficult for the operator and the patient. In striving to perfect a simple method for the immediate closure of the maxillary sinus following tooth extraction, and also the chronic antraoral openings, 32 gage tantalum plate is being used.

On occasions during the extraction of a maxillary tooth, the antrum is entered (Fig. 1, *A*). Immediately following removal of the tooth, the lingual and buccal mucoperiosteum is retracted from the adjacent teeth a sufficient distance to allow

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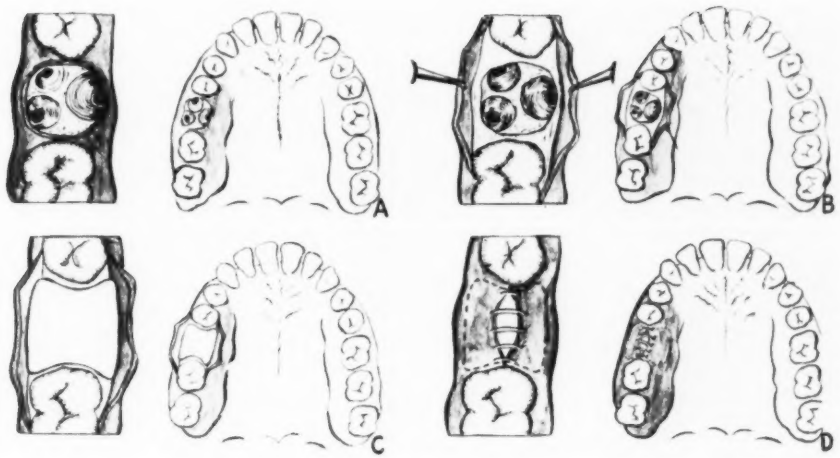

Fig. 1.—A: Antrum is entered during extraction of maxillary tooth. B: Mucoperiosteum is retracted from the adjacent teeth to allow insertion of the tantalum plate. C: With the mucoperiosteum retracted, the tantalum plate is placed directly over the tooth socket. D: The mucoperiosteum is sutured back to its normal position

the insertion of the contoured U-shaped tantalum plate to cover the entire socket (Fig. 1, *B*), and to extend to the buccal and lingual aspects of the tooth socket a distance of 8 to 12 mm.

With the mucoperiosteum retracted, the tantalum plate is placed directly over the tooth socket (Fig. 1, *C*).

Following insertion of the tantalum plate over the socket, the mucoperiosteum is sutured back to its normal position (Fig. 1, *D*). The sutured mucoperiosteum will not cover the entire tantalum plate, but this is of no consequence, as the plate is to be removed after a period of from 14 to 30 days following insertion, depending on the size of the original antrum opening at the time of extraction of the tooth.

After sufficient time has elapsed for granulation tissue to form in the tooth socket, the tantalum plate is raised from the healed tooth socket with a hooked instrument. The tantalum plate is cut in

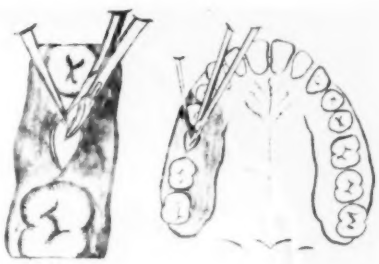

Fig. 2.—After the tooth socket has healed, the tantalum plate is raised with a hooked instrument, cut in two pieces and removed.

two pieces from mesial to distal and removed (Fig. 2). Following removal of the plate, further suturing and tissue contouring is not necessary.

To close a chronic antraoral fistulous opening, the surgical procedures are much the same as immediate closure following tooth extraction, except the maxillary sinus should be free from infection, and the fistulous tract from the maxillary sinus to the oral cavity must be removed.

Before the tantalum plate is inserted for the closure of a chronic opening, holes 3 by 5 mm. are cut in the part of the plate that extends to the buccal and lingual aspects of the antraoral opening. Following insertion of the tantalum plate, the mucoperiosteum is sutured over the plate. The holes in the tantalum plate allow the periosteum to come in contact with the bone, holding the plate firmly in position. Healing of the sutured mucoperiosteum covering the plate will be by first intention. The tantalum plate is not removed following closure of a chronic antraoral fistulous opening.

Nevi

■ *Lloyd E. Church, D.D.S., M.S., Bethesda, Md.*

Nevi are exceedingly common growths, and it has been estimated that there is an average of 20 common nevi on each human body.[1]

When an abrupt change in size or color appears, a person should exhibit much more than just a passing interest. Should that nevus undergo a malignant transformation, it will develop into one of the deadliest and most rapidly fatal forms of cancer known—malignant melanoma.

Most nevi should be left alone and need not be removed. They are harmless and will never become malignant. Only certain types of nevi are subject to malignant change. Usually, the darker the nevus is, the more likely it is to have malignant properties. However, many of the darkest nevi are permanently benign, while some of the most pale or even colorless ones can be the origin of melanoma.[2] The blue nevus, believed by some investigators to be a threatening lesion, infrequently develops into melanoma.[3]

1. Boyd, W., *A Text-Book of Pathology*, ed. 5. Philadelphia: Lea & Febiger, 1947, p. 294.

2. Ackerman, L. V., Malignant Melanoma of the Skin; Clinical and Pathologic Analysis of 75 cases. *Am. J. Clin. Path.* **18**:602 (Aug.) 1948.

3. Montgomery, H., and Kahler, J. E., The Blue Nevus: Its Distinction From Ordinary Moles and Malignant Melanomas. *Am. J. Cancer* **36**:527 (Aug.) 1939.

Evidence has been presented[4,5] that all malignant melanomas develop from a pigmented lesion described as a junction nevus, arising from the epidermodermal junction. Most junction nevi are pea-shaped, relatively smooth, flat or slightly raised, hairless, ranging in color from light brown to black and are seldom verrucous or pedunculated. The junction nevus occurs most frequently on the head, hands, feet and genitals. The exact diagnosis of a junction nevus must come from a pathologist.

A sudden change in growth rate, bleeding, change of color, a painful or itching feeling, an inflammatory halo or ulceration of a nevus have long been considered as early signs of melanoma. However, the appearance of symptoms is indicative that the process of transformation has already begun, for there are no truly early signs.

Rarely will a nevus undergo apparently spontaneous transformation. In most cases there is a history of trauma, usually chronic. The irritation of clothes, especially belts, straps, collars and shoes, is frequently responsible. Lesions on the faces of men are sometimes due to daily irritation by a razor. Inadequate removal of moles by caustics, dry ice, or electrodesiccation and other unsatisfactory measures, merely invite malignant change in later years. Few moles removed by these methods show any malignant aftereffects, but those that do and subsequently metastasize give sufficient reason to condemn the practice of incomplete removal by electrical means, caustics and solid carbon dioxide.

A potentially malignant nevus should be excised completely, with a margin of normal skin. The incision should extend through the full thickness of the skin and subcutaneous tissue. An immediate microscopic examination should be made by a competent pathologist, and if the tissue is malignant, a more extensive operation should be performed.

Many nevi are likely to become malignant while gonadal secretion is at its height. It has been suggested[6] that mole growth is under hormonal control. Rarely does a mole show signs of malignant degeneration before puberty. Many melanomas develop during pregnancy when the endocrine system is especially active. However, during this period all nevi or pigmented areas have a tendency to become darker. These should be watched carefully.

Considering the difficult and deadly nature of malignant melanoma, there is, however, no reason for a fearful attitude toward all common nevi. They should be located and examined. Those in danger areas, or in positions exposed to constant irritation, should be surgically excised. The others should be watched carefully.[7] In this way, a person with his share of moles may live in peace with them, free from the threat of malignant melanoma.—*7649 Georgetown Road.*

4. Traub, E. F., Early Recognition of Possibly Dangerous Nevi (Moles) and the Best Procedure to Avoid Development of Malignant Melanomas (Nevocarcinoma). *New York State J. Med.* **49**:1661 (July 15) 1949.

5. Traub, E. F., and Keil, H. The "Common Mole." *Arch. Dermat. & Syph.* **41**:214 (Feb.) 1940.

6. Delario, A. J., The Common Non-Vascular Nevi and Their Treatment. *Am. J. Surg.* **78**:53 (Jan.) 1949.

7. Paik, G. T., The Management of Pigmented Nevi and Malignant Melanomas. *South. M. J.* **40**:832 (Oct.) 1947.

Physical treatment of trismus and partial ankylosis of the temporomandibular joint

■ *Ath. P. Panagopoulos, D.D.S., Chicago*

In everyday practice, doctors in all fields of specialization, and particularly those who deal with oral medicine and oral surgery, are confronted by various degrees of trismus and partial ankylosis of the temporomandibular joint. Many diseases, as well as local infections and inflammations of the muscles of the masticatory apparatus, have as their symptoms or results varying degrees of dysfunction of the muscles and of the joint.

In most cases, immediate or gradual recovery automatically follows treatment.

Often, however, despite efforts to remove the cause of the trismus or partial ankylosis of the temporomandibular joint, it is difficult to alleviate the symptoms. In such cases the application of physical treatment as soon as possible is indicated. The special equipment required for treatment should fulfill the following requirements:

1. The action of the equipment should be mild and continuous.

2. The placement and use of the equipment in all degrees of trismus should be gentle.

3. The force of the pressure should be under control at all times.

In order to meet these important requirements a new type of exerciser has been devised, the results of which are satisfactory. It consists of two perforated trays similar to those used in taking impressions. The upper plate has no palatal base, and the lower has no lingual wall. In the two sides of each tray are horizontal tubes approximately 1 cm. in length, into which are forced the secondary springs. In the anterior portion and in the midline there is a special support to which one or two principal springs are attached. A crescent shaped notch on the labial wall of the trays protects the lips from injury (Fig. 1). Even in the most serious cases of trismus there is some degree of oral opening, and impressions of the occlusal surfaces of the teeth can be taken. This is important, because those impressions act as a key when replacing the appliance in the patient's mouth. The small holes in the floor of the trays hold the impression substance in place.

This type of exerciser can be used in the hospital for general use, and an individual one can be constructed using the same basic principles. The appliance is prepared in the same manner with acrylic material, except for the metal springs. This type has the advantage of being better fitted, lighter of weight and more comfortable to wear.

This exerciser has been widely used in Greece since 1942, and results were

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satisfactory in the majority of cases of trismus.

Some of the advantages of the appliance are given here.

1. The action is mild and continuous and is under control at all times (Fig. 2). Maximum movement can be checked by a dynamometer which measures the force in grams. The minimum spring force of the secondary springs must be approximately 125 Gm., while that of the principal spring must be 1 Kg.

2. The exerciser can be easily applied even in the severest degree of trismus, because the thickness of the two plates is not more than 3 mm.

3. The force applied is the same at every point of the dental arch, thus the degree of pressure is distributed equally. In this way pressure injuries to the dental structures are prevented. The restraint offered by the lips and cheeks helps prevent pressure injuries.

4. This appliance preserves the bilateral movements of the mandible.

This exerciser has been of value after the removal of fixating appliances, especially in treating fractures of the angle of the mandible, the ramus and the condyloid and coronoid processes (Fig. 3).

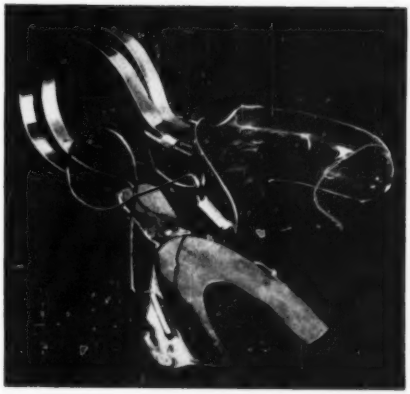

Fig. 1.—Appliance used in treatment of trismus and partial ankylosis of the temporomandibular joint

The exerciser is used in cases of partial ankylosis of fibrotic nature, providing there is small motion of the mandible. A roentgenogram to check if the condyles are freely movable should be taken.

In cases of multiple and complicated fractures of the upper third of the ramus, condyloid and coronoid processes, where the mandible is not fixed to the maxilla, the appliance is of value (Fig. 4). It may help to avoid a possible ankylosis of the temporomandibular joint. In these cases,

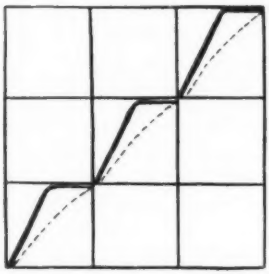

Fig. 2.—Diagram comparing the difference in action of the usual appliance (heavy outline) with the appliance described (dotted line). The exerciser described follows a normal action curve because the action is mild and continuous

Fig. 3.—Left: Preoperative view of a patient with fracture of the left condyle. Center: Reduction of condylar fracture resulted in good occlusion, but pronounced trismus. Right: Exerciser in patient's mouth for treatment of trismus

the treatment consists of an exercise which provides continual movement, producing a pseudoarthrosis.

In cases of permanent trismus resulting from contraction of masticatory muscles or tissues following scarring, or trauma and which can be repaired surgically, the exerciser is used postoperatively for continual and gradual separation of the jaw (Fig. 5).

Fig. 4.—Postoperative physical treatment of trismus after multiple fracture of the mandible. Only the secondary springs are used for bilateral movements of the mandible

The appliance is often used after removal of the condyloid process because of an ankylosed temporomandibular joint.

The exerciser is also used as symptomatic treatment in general diseases affecting the masticatory apparatus such as tetanus; for exercise during or after orthodontic treatment; for prolonged trismus after surgical extractions; for trismus resulting from irradiation.

The main disadvantage of the original appliances of Darcissac, the metallic splint of Kingsley or Ivy's variation of it is that they do not provide for the bilateral and anterior-posterior movements of the mandible.

The fine Dorrance Webster exerciser, or the variations of Darcissac, Kuhn and Steinkamm cannot be ignored. However, one disadvantage of these appliances is that they cannot be applied through a narrow opening of the mouth, but require an opening of 2 cm. or more in order that impressions for the construction of the splints can be made. Generally, the prin

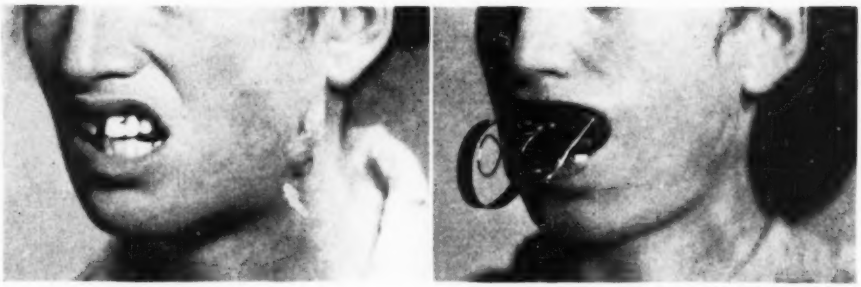

Fig. 5.—Left: Complete trismus from osteomyelitis of the left mandible, with chronic inflammation of the masseter muscle. Right: Postoperative use of exerciser, illustrating the opening obtained

cipal use of these appliances is in the post operative period following removal of the condyloid processes for ankylosis of the temporomandibular joint.

These exercisers also possess all the disadvantages of the immediately applied force as opposed to the gradual, controlled application of force in the exerciser described here.

The following is suggested routine for the application of the exerciser. Usually it is applied three times for periods of three minutes each during the first two days, using only the secondary springs. The exerciser is applied five times on the third, fourth and fifth days, with one of the principal springs. On the sixth day the second principal spring is added. If the patient cooperates and does the exercise systematically, the opening movements of the mouth will be normal after a week or 10 days.

This exerciser was satisfactory in the majority of cases in which it was used. However, improvements and modifications will add greatly to its over-all usefulness.

■ Intellectual Freedom

Science will fulfill what is demanded of it only on condition that it retain its freedom and independence in its work. In spite of all necessary limitations, liberty remains an essential characteristic of science, and spiritual and intellectual freedom is a necessity for scientists. Every true scientist desires to serve his nation. His work, however, cannot be complete if it is merely a service to his nation.—*Ferdinand Sauerbruch, The Scientific Monthly 72:258, April, 1951.*

The prevention of anesthetic fatalities

■ *E. A. Rovenstine, M.D., New York*

The progress achieved in the practice of anesthesiology has been considerable during the past few years. Many new drugs have been prepared, technics have been brought nearer perfection and improved appliances have become available. Of more significance has been the changing attitude toward this special practice of medicine. A growing number of physicians have been attracted to the specialty and are devoting their efforts exclusively to the training of an increasing number of their confreres, to clinical and laboratory investigations and to improving methods of practice. Add to these the rapid strides in other fields of medicine, whereby methods for dealing adequately with anesthetic complications such as atelectasis, circulatory depression and many others have come into being, and the statement is justified that anesthesia is safer for the patient today than any time in more than its century of use.

All of these developments have not served, however, to eliminate anesthetic fatalities. In hospitals, with all the modern safeguards, deaths from anesthesia should be a rare occurrence. All patients now have an examination to determine the condition of their vital functions, laboratory tests to evaluate further their physical status and other desirable studies. The patient reaches the operating room with an empty stomach, with carefully planned preanesthetic medication and the anesthetist has at his command a large number of procedures from which to select the one best suited for the patient. Postoperative recovery is similarly dealt with by trained personnel under most convenient and safe surroundings. Despite all this the incidence of anesthetic deaths is probably greater in the more advanced surgical centers now than at any time during this century. The nature of the surgical procedures has placed new demands on the anesthetist and increased the hazards. The type of patient, those with every infirmity and of every age group, has further complicated his work. However, among the fatalities recorded are many that are definitely preventable and cannot be charged off to the patient or the surgeon. Frequently the anesthetist lacks the ability to handle satisfactorily a situation fraught with great danger or he lacks the experience and judgment necessary to protect the patient from such dangers.

It cannot be expected that all the advances in anesthesia and all the training and experience of those who administer it will ever eliminate human errors. There is little surgeons can do to prevent them. Today dental patients in a hospital may have the conveniences necessary to complete the surgical procedure and they may

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have the attention accorded any other hospital patient, but from there the anesthetist usually has the liberty of carrying out his manipulation as he chooses.

The more important consideration here is the patient who will not have all the advantages of the modern hospital and its staff. These are the patients who will have anesthesia administered to them in the clinic or in the surgeon's office, and will be expected to leave the operating room, most often unaccompanied, soon after anesthesia has been discontinued.

Anesthetic fatalities among this group of patients, although not common, still occur. All of these deaths are preventable. Death could be further classified as due to one of two causes. Anesthesia was administered improperly or the anesthetist lacked the judgment needed to select patients that should be given general anesthesia. A single drug and a single technic cannot be used for every patient who may need pain relief for exodontia or oral surgery. Patients are not fitted to a single anesthetic procedure but the anesthetic procedure is chosen to fit the patient. Therefore, the selection of patients for general anesthesia should constitute the most important consideration in preventing anesthetic fatalities. Economics of time, space, manpower and even the present day dollar make it impossible to equip the busy clinic or office with all the drugs and appliances that are available in the modern hospital for general anesthesia. One or two simple technics and as many drugs usually make up the list. If patients are not suitable for these the better part of wisdom is to secure pain relief by other means or provide hospital service for the patient.

Today a wide section of the population is made up of people who have heart disease. Improved care of the young who have had rheumatic fever or other early cardiac diseases, has brought more individuals into the adult group who have a low functioning cardiac capacity. These individuals may die suddenly, sometimes at the height of emotional excitement. Many have finished a day's work and died suddenly while reading the evening newspaper or while resting in bed. These instances are not confined to the aged. One young dentist died recently in New York with a patient before him in the chair. The excitement that may be attended with a trip to the surgeon's office or the fear of losing consciousness from anesthesia may tax a heart already overburdened to the extent that it will fail to carry on essential activity. If fatalities in this group are to be avoided in the ambulatory patient some reliable means must be readily available to identify them. The simplest way would seem to be found in merely questioning the patient about any heart or circulatory condition known to him. This will not solve the problem entirely since many of these individuals are not aware that they are cardiac cripples or at least do not understand its seriousness. Many patients with a malfunctioning heart learn of it only when they have a routine medical examination. Furthermore, it is often the desire to hide the known fact that one cannot take his place in the physical activities of a normal life. A patient may boast of playing nine holes of golf but he will scarcely let it be known that he no longer can climb a flight of stairs comfortably. If a patient has experienced a bout of congestive heart failure or a coronary occlu-

sion he will be frightened, usually to the extent that he will submit to nothing out of the ordinary and he will be closely watched and advised by his doctor.

Among patients with cardiac disease who should be denied general anesthesia except under the most favorable circumstances and expert administration are those with valvular lesions particularly mitral stenosis which so often follows an attack of rheumatic fever. The blood from the lung to the heart is retarded and if the heart is accelerated or called upon to increase its work load engorgement of the lung or pulmonary edema may follow. Another group of patients may have high blood pressure with the left ventricle overworked to the extent that any sudden increase in the load upon it will lead to failure. Patients with arteriosclerosis, where the coronary circulation is reduced, with the heart muscle not getting enough oxygen, and those having an abnormal cardiac rhythm may have sudden onset of fibrillation and consequently heart failure. These are among the common cardiac patients seen daily at business and during other normal activities. It is among these that sudden fatal circulatory accidents occur most often.

There are some simple questions and observations that aid materially in determining the probability of serious heart disease. Cyanotic mucous membranes are suggestive and swollen ankles are an indication. If the patient gets short of breath on slight exertion or experiences pain in the chest with exercise it is most often because of circulatory inefficiency. It has been said often and unfortunately without too much significance that if a dentist plans to give nitrous oxide in his office he should locate on the second floor and have patients walk up. If they are out of breath when they reach the office, procaine should be used. There is one simple test for cardiac efficiency that can be quickly applied at any time. Referred to as the breath-holding test, it utilizes the patient's ability to sustain himself without oxygen. The patient is instructed to take a moderately deep breath, close his lips and pinch his nostrils together. Forty seconds or more is within the normal range and below 20 seconds leads to the suspicion that cardiac or circulatory efficiency is impaired. Many experienced anesthetists have insisted that if they could have only one bit of information about a patient they would prefer knowing how long he could hold his breath without real discomfort.

The many manifestations of anoxia have been known for centuries. From the time men started climbing mountains or dug deep in the earth for coal or minerals this strange sickness was known. It was, however, less than 70 years ago that the physiologist Paul Bert provided the answer to altitude illness when he proved that the symptoms occurring in high altitudes were due to a lowered oxygen pressure incident to a lowered barometric pressure. He pointed out that the same result could be had with nitrous oxide anesthesia. Many years later the miner's sickness was associated with anoxia from "fire damp," later identified as carbon monoxide. The airplane and the submarine focused attention on the physiologic effects of anoxia, and today the body of information is sufficient for the anesthetists' understanding of the hazard.

Nitrous oxide has long been identi-

fied with anoxia. Nitrous oxide, a simple inorganic chemical has not been found to produce a toxic reaction for any tissue. In fact, this singular property of the gas, together with its commanding appeal of noninflammability and pleasant sensation for the patient breathing it are strong factors in favoring the frequent use for ambulatory patients.

At the beginning of the present century nitrous oxide was considered "the safest anesthesia agent known" by Hewitt,[1] the recognized European leader in this field. The experience of Colton in this country lends agreement since he reported many thousands of administrations without a death. At that time anoxia was undoubtedly a part of every nitrous oxide anesthesia. Hewitt recommended a mixture containing 7 per cent oxygen. Colton used no oxygen. The point in contrast with today's practice is the different interpretation of anesthesia. In America patients were allowed to breathe the gas until they became unconscious and then the face mask was removed and teeth were extracted quickly before consciousness returned. Hewitt claimed that with a 7 per cent oxygen mixture he could produce anesthesia for about 50 seconds. The safest anesthetic drug for patients being anesthetized for less than a minute did not maintain its reputation when given for an hour.

There is ample experimental evidence available now to support an early observation by Brown, Lucas and Henderson[2] that "patients anesthetized with nitrous oxide will always suffer from a severe degree of anoxemia." They were referring, of course, to patients not only unconscious but in light (first plane) narcosis. If this is accepted as true, and there are no experimental results to dispute it, the mortality and morbidity rates from nitrous oxide should be significant.

Statistics for nitrous oxide-oxygen anesthesia in office and clinic practice are difficult to obtain since reports from these sources are infrequent and inadequate. If statistics are collected from files of daily newspapers, the representatives of insurance companies and friendly talks with anesthetists, the mortality is not negligible. In a study made five years ago 11 such deaths were reported that had occurred during the preceding five years in New York.[3] This is not a large number but all these were preventable fatalities in ambulatory patients who were not ill or did not require hospitalization.

Since deaths do occur as a result of nitrous oxide anesthesia it must be assumed that technical errors are often committed or the present approved principles for administering nitrous oxide are at fault. That the former is true is readily admitted. The latter fault, the hazard of currently approved technics, is now being scrutinized critically since recent investigations have revealed that widespread degeneration of the brain may result from nitrous oxide-oxygen anesthesia.

One of the most significant of such investigations is the report of Courville,[4] in 1936, followed by a more elaborate

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2. Brown, W. E., Lucas, G. H. W., and Henderson, V. E., The Anesthetic Value of Nitrous Oxide Under Pressure, *J. Pharmacol. & Exper. Therap.* 31:269 (Aug.) 1927.

3. Barach, A. L., and Rovenstine, E. A., The Hazard of Anoxia During Nitrous Oxide Anesthesia. *Anesthesiology* 6:449 (Sept.) 1945.

4. Courville, C. B., Asphyxia as a Consequence of Nitrous Oxide Anesthesia. *Medicine* 15:129 (May) 1936.

monograph three years later.[5] These extensive studies left little room for disagreeing with his conclusion that serious as well as fatal results may follow nitrous oxide-oxygen anesthesia, even though it is administered without gross error and by accepted technics. Courville classified the cases studied into several groups. The first of these included patients who died during anesthesia. Death in these instances could be attributed to a pre-existing lethal lesion, to an intercurrent lesion independent of the surgical one, to a combination of disease and asphyxia, or, finally, directly to the effect of the anesthetic agent itself. In the last group, no pathologic lesion is found at autopsy to account for sudden death.

Delayed exitus after nitrous oxide-oxygen anesthesia constitutes a second group. These patients may survive for hours or days, and from them valuable pathologic studies have been made. The anoxia produced during anesthesia initiates a process that progresses until a situation is reached that is incompatible with life. Cases corresponding to this classification are numerous, and most anesthetists are familiar with one or more in their own practices or in the practices of their confreres.

Instead of hours, the survival period may be greatly prolonged. Typical in this group are patients who have transient respiratory failure, followed by a period of several hours of convulsions and coma, temporary improvement of the mental state for a day or even weeks, then progressively neurologic symptoms and finally death. The typical degenerative changes in brain tissue are present.

Another group in the classification are those with serious morbidity due to the anesthetic agent. They include cases with recovery but with residual mental symptoms indicating cortical nervous system damage. These patients may present few clinical manifestations of anoxemia during anesthesia. Recovery from narcosis is usually delayed, and mild to severe convulsions may be noted during the prolonged coma. The residual symptoms may be indicative of cortical or lenticular damage or both. The final group includes those who have transitory mental and emotional manifestations but apparently recover completely. Visual and auditory disturbances, aphasia, convulsive states and delirium are among the complications from which complete recovery has been reported.

The consequences of nitrous oxide anesthesia which have been reviewed by Courville are due to the accompanying anoxia. Granting that anoxia is the pathogenic factor in cerebral damage during nitrous oxide-oxygen anesthesia, the existence of predisposing factors, if any, assumes major importance. There are numerous reports of prolonged severe anoxia with complete recovery. Ward and Olson[6] describe "the most severe case with recovery that has ever been reported." A member of the crew of a bomber flying at 25,000 feet was found, after being without oxygen for 55 minutes, "unconscious, apneic and markedly cyanotic with ice in mouth and nostrils." The patient was unconscious for eight hours and semicomatose for eleven more. After this, there were

5. Courville, C. B., *Untoward Effects of N_2O Anesthesia*. Mountain View, Calif.: Pacific Press. Assn., 1939.

6. Ward, R. L., and Olson, O. C., Severe Anoxia with Recovery. *J. Aviation Med.* 14:360 (Dec.) 1943.

no subjective symptoms, and psychologic changes lasted only six days. Recovery was considered to be complete. Many other reports provide evidence that some individuals may survive, without serious residual manifestations, prolonged stagnant anoxia and anemic anoxia.

In the clinical literature, observers have frequently suggested that some predisposing factor or factors may account for the apparent disparity in the tolerance of individuals to low oxygen concentrations. The rather loose term, idiosyncrasy, has been used to explain a minimal tolerance to anoxia. Other more or less vague explanations have associated the untoward effects of anoxia with status thymicus, chronic alcoholism and other disease processes. It has been regularly recognized that the contributory effect of certain disease states in the production of anoxemia may be significant.

Pulmonary lesions that interfere with the transport of gases to aerate the blood, anemias that result in one type of anoxia, diminished cardiac reserve and hyperthermia are unanimously acknowledged as predisposing factors in low tolerance for anoxia. It may be generally stated that an individual who suffers from chonic anoxia will react quickly and severely to an imposed acute anoxemia state. However, except in the presence of the specific conditions enumerated in this paper, no method is available for the selection of individuals who may suffer severely from brief bouts of anoxia from those who will recover fully after prolonged oxygen want. Even the physiologically trained anesthetist who deals with anoxia constantly will avoid such prognosis, although extensive intelligent experience improves his judgment and provides an alert defense against complications in individuals who, before or during induction of anesthesia, arouse the suspicion that they have little resistance to anoxia.

In order to prevent fatalities from anoxia during or following nitrous oxide anesthesia the use of technics that favor the use of 100 per cent nitrous oxide for even short periods must be regarded as dangerous, and the use of mixtures of nitrous oxide containing less than 20 per cent oxygen for longer periods must be considered potentially dangerous. If protracted anesthesia (several minutes) is desired with nitrous oxide a certain number of patients will not become anesthetized sufficiently to permit painless surgery or exodontia unless the oxygen concentration is decreased below that compatible with life. The hazard of so doing is now clear and established. For such individuals nitrous oxide should be abandoned or complemented with a more potent agent such as vinyl ether. Modern anesthetists must decree emphatically that the patient is not to be fitted to the anesthetic technic, but new technics must be devised to meet the circumstances.

Anoxia frequently results from obstruction to the respiratory airways. Obstruction frequently is due to the soft tissues such as the tongue, or to packs or instruments. Laryngospasm is another common source of respiratory obstruction. No anesthetic agent should be administered in the presence of obvious obstruction. The first rule for an anesthetist is a clear airway.

Anesthetic fatalities from other than the causes discussed are not reported often. Attention has been directed toward the

danger from aspiration of vomitus during induction or recovery from anesthesia. The ambulatory patients whose intake of food is not controlled or those who may use alcohol to bolster up their courage for the ordeal in the dentist's office are good candidates for the emesis basin. Preventing aspiration is best done by taking advantage of the patient's reflexes and placing them in the head down position to favor removal by gravity. Anesthetic fatalities due to an overdose of the more potent agents, thiopental, vinyl ether or ethyl chloride, are obviously technical errors. Ethylene, because it is explosive and has a disagreeable odor, is little used. Its advocates do have the argument that it is more potent than nitrous oxide, permitting a higher concentration of oxygen in the mixtures and thereby decreasing the hazard of anoxia.

Procedures that have value in preventing anesthetic fatalities in the presence of serious complications are without the scope of this discussion. There are no drugs such as the analeptics to recommend. The accepted method for controlling convulsions is intravenous administration of the barbituric acid derivatives. The administration of oxygen and efficient artificial respiration are most often indicated. No one should administer anesthesia who has not mastered methods for adequately ventilating the lungs artificially.

■ *Summary*

The fatalities that occur during anesthesia to ambulatory patients may often be attributed to the improper selection of patients for general anesthesia or the attempt to fit every patient into a routine technic. These hazards are discussed and several measures to obviate them are suggested.

■ Ulcers

Ulcers of the stomach and the duodenum constitute a serious medical and surgical problem. These conditions or a history of them was reported for one out of every 250 young men examined for military service in the peace-time draft. On the basis of the findings of the National Health Survey (1935-1936), there would now be about 400,000 persons with peptic ulcer in the United States, but autopsy studies indicate that the actual number of cases is much larger.—*"Recent Trends in Peptic Ulcer." Statistical Bul. Metropolitan Life Insurance Company 30:6. July, 1949.*

Internal derangements of the temporomandibular joint

■ *Don H. Bellinger, D.D.S., Detroit*

The multiplicity of descriptive terms applied to internal derangements of the temporomandibular joints, other than obvious affections such as ankylosis, dislocation, fracture and so forth, is mute testimony to the lack of comprehensive understanding of the involved pathology. For the most part, these terms have been coined after the more prominent symptoms, such as cracking, snapping and habitual dislocation, or according to supposed changes in the joint such as arthrosis, subarthrosis, dysarthrosis and the disk-mandibular syndrome. This disconcerting state of affairs constitutes the reason why many practitioners approach each new patient with temporomandibular joint complaints with a feeling of despair and an absence of enthusiasm. This attitude is not justified, as knowledge of the affections of this joint is not as chaotic as it may appear.

There has been delay in applying to the temporomandibular joints the same well-understood disease processes that affect other joints of the body. Almost all human joints have been extensively subjected to microscopic study for the structural changes occurring in disease except the temporomandibular joint. So far as the literature reveals, only one such study[1] of the temporomandibular joints has been made, but this study was the more important because of the fact that several of the cases studied had been examined before death with particular reference to the clinical findings.

Only a brief summary of the joint structures which are important from the point of view of development of disease will be discussed here. The articular surface of the condyle, the mandibular fossa and the eminentia articularis are all normally covered by cartilage arranged in layers. The innermost, or that layer of cartilage immediately adjacent to the subchondral bone, is hyaline while the outermost zone is fibrocartilage consisting of many fibers running parallel to the surface (Fig. 1). Peripherally there is a smooth transition of this cartilaginous covering into the periosteum and joint capsule. This cartilage covering the articulating bone ends serves as a smooth, resilient cushion capable of withstanding strong compression shocks. A film of synovial fluid separates the opposing cartilaginous surfaces, providing lubrication. The articular cartilage has no nerve or vascular supply and possesses a low metabolic rate, in consequence of which it has but limited reparative ability.

Presented before the thirty-third annual meeting of the American Society of Oral Surgeons, Washington, D. C., October 10, 1951.

Chief, division of oral surgery, Henry Ford Hospital, Detroit.

1. Bauer, Wm. H.: Osteo-arthritis Deformans of the Temporomandibular Joint. *Am. J. Path.* 17:129 (Jan.) 1941.

The normal articular disk or meniscus which divides the joint into two compartments is made up of collagenous fibrous tissue arranged parallel to the surface of the condyle and containing relatively few scattered chondroid cells. Elastic fibers are demonstrable between the collagenous fibrous tissue pointing to the additional shock absorbing mechanics of the joint. Blood vessels and nerves are found in the peripheral portion of the meniscus as part of an extension of the synovial membrane. The main function of the articular cartilage and the meniscus is the protection of the subchondral bone against abnormal and damaging stresses.

The joint cavity is enclosed by a sleeve of loose connective tissue composed of two layers: an external layer of fibrous tissue and an inner, or synovial, layer that provides the synovial fluid. The synovial fluid apparently carries both nourishment and oxygen to the articular cartilages. The capsule as a whole is generously supplied with nerves, blood vessels and lymphatics.

While no nerve fibers have been demonstrated in either the subchondral bone or articular cartilage, there is an abundance of sensory and vasomotor nerves in the synovial membrane, meniscus, capsule and periarticular tissues which apparently are the receptors for pain. Joint pain results from any agent irritating the free nerve endings, whether from inflammation and increased pressure in the tissue or from trauma.

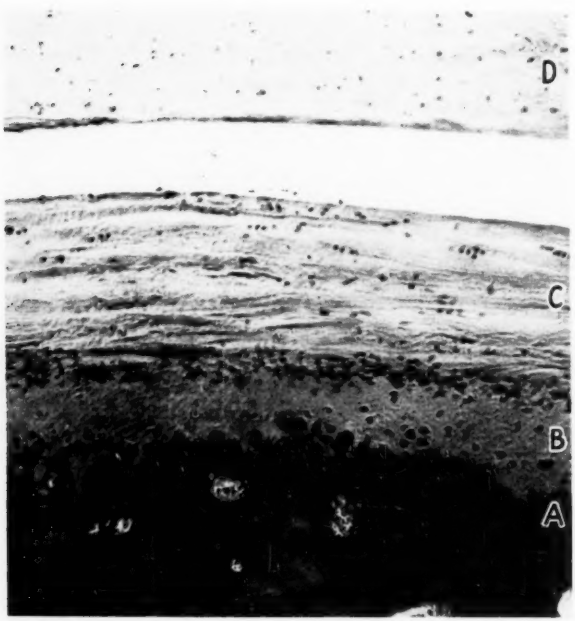

Fig. 1. Normal cartilage of mandible separated by joint space from disk.[1] X 96. A: Innermost layer of hyaline cartilage containing large basophilic cartilage cells. B: Second or middle layer containing fewer basophilic cells. C: Third or outermost zone, which is wider and composed of fibrocartilage, consisting of many fibers running parallel to the surface and of relatively few flat cells. D: Normal articular disk is composed of collagenous fibrous tissue arranged parallel to the surface of the condyle and containing few scattered chondroid cells.

Table 1
Traumatic arthritis

Etiology	Severe single injury
Onset	Sudden
Age of onset	Any age, but more frequent in young
Involvement	Monoarticular, but dependent upon extent and severity of injury
Symptoms	Pain, swelling, limited motion, muscle spasm and possibly ecchymosis
Roentgen signs	Joint area usually cloudy and indistinct owing to effusion of synovia and blood
Treatment	Rest. Cold compress over area, followed by heat
Prognosis	Good. Reversible

Joint disease is termed arthritis and is one of the oldest diseases known, yet one of the most neglected. There are many different forms, some caused by known etiologic agents, while in others the etiologic factors remain to be proved. Some types are characterized by certain pathological and clinical features which make their differentiation relatively easy. In other forms the clinical pattern varies considerably and identification may require detailed study. As far as the temporomandibular joint is concerned, most cases of arthritic involvement fall into one of four major groups: (1) cases in which the arthritis results from acute direct trauma to the joint; (2) the frankly infectious cases caused by a specific microorganism; (3) cases of unproved etiology but probably due to endocrine dysfunction; (4) cases representing degenerative forms of joint disease.

■ *Traumatic Arthritis*

Only acute direct trauma is included under the term, "traumatic arthritis" (Table 1). In the past, chronic joint disease produced by minor, repeated trauma has been included in this term. However, since the end result in the latter may differ in no way from degenerative joint disease, current practice excludes such cases and labels them simply as degenerative joint disease secondary to trauma.[2] Acute traumatic affections of the temporomandibular joint may result from strains, severe blows or falls, fractures into the joints, dislocations; in fact, any severe trauma to the region.

The effect of trauma upon articular structures depends on the type, severity and duration of the injury, as well as the reaction of the individual. The primary pathologic reaction is a synovitis, but this is often complicated by hemorrhagic effusion into the joint space which is especially true when the capsule is torn. When articular structures other than the synovial membrane are damaged, changes similar to degenerative joint disease result almost invariably.

Traumatic joint disease is usually monoarticular. The symptoms, usually acute with sudden onset, include pain, particularly on motion, and localized tenderness. Objectively there is localized tenderness, swelling, limited motion, frequently ecchymosis and muscle spasm. With synovial effusion, hemorrhage, or both, into the joint space the area will appear cloudy and indistinct on roentgen examination.

2. Comroe, B. I., *Arthritis and Allied Conditions*. Philadelphia: Lea & Febiger, 1949.

Treatment in acute traumatic disease of the temporomandibular joints consists of rest, cold applications in the early stages, followed by heat in the later stages and the administration of analgesics for the control of pain. Jaw action should be limited, resorting to intermaxillary immobilization if necessary, but passive action should be permitted as the pain and soreness subside. The prognosis is good as the disease is reversible with proper and adequate treatment. A specific history of trauma, sudden onset of symptoms and its monoarticular nature serve to establish the diagnosis and differentiate it from other joint derangements.

■ *Infectious Arthritis*

This form of arthritis has reference to the metastatic invasion of the articular structures by specific organisms (Table 2). These organisms reach the joints by way of the blood stream or by direct extension; therefore, with the exception of tuberculosis,[2] in a large percentage of cases invasion of the blood stream will be accompanied by a chill, chilly sensations and a rise in temperature. There may or may not be the accompanying findings which characterize bacteremia or septicemia. The organisms of gonorrhea, syphilis and tuberculosis are the chief offenders in this type of arthritis, although in the case of the temporomandibular joint, it may occur as a direct extension of pyogenic infection from the mandible, maxilla or mastoid region. The onset is usually acute, but may be insidious, frequently polyarticular and migratory at first, finally settling in one or more joints. The cardinal signs of inflammation are usually present and pain is often severe. The synovial fluid may become purulent and, if the disease is not arrested, it causes destruction of the articular structures and crippling. It is one of the most frequent causes of ankylosis of the temporomandibular joints.

The existence of specific infectious arthritis is usually suggested by the history. Bacteriologic tests should be resorted to whenever possible. Cultural methods are superior to relying on demonstration of the organism by smear. Demonstration of the organisms in aspirated joint fluid allows for a proved diagnosis. The incidence of this type of arthritis has decreased greatly since the advent of chemotherapy and the antibiotics. Treatment is directed both systemically and locally. The affected joint should be at absolute rest, as motion is extremely painful. Passive motion should be allowed as soon as painless

Table 2
Infectious arthritis

Etiology	Specific bacteria
Onset	May be acute or insidious
Age of onset	Any age. Most prevalent 20 to 40 years
Involvement	Polyarticular at onset—finally developing into a monoarthritis
Symptoms	Pain, swelling and muscle spasm
Roentgen signs	Usually absent in early stages. Periarticular swelling and bone atrophy follow later. Destruction of bone and cartilage
Treatment	Systemic with supportive and protective therapy to involved joints
Prognosis	Good. Ankylosis may be a terminal complication

movement is possible. Analgesics for relief of pain are used as indicated.

■ *Rheumatoid Arthritis*

The cause of this form of arthritis is still not fully understood[4] (Table 3). It is a disease of temperate climates, with low incidence in the tropics. It has a definite familial tendency. Females are more commonly affected than males in a ratio of 3:1. Eighty per cent of the cases occur between the ages of 20 and 50, with the peak at 35 to 40. Investigation shows that in the period preceding the onset of symptoms, emotional shocks are common and severe depression is frequently present. Pregnancy causes an amelioration of symptoms in a significantly high proportion. Recent work indicates that disordered adrenal cortical function is an important etiologic factor.

Rheumatoid arthritis produces widespread pathologic leisons. Joints are the main scene of destruction but structural changes are found in many additional tissues and organs. Symptoms referable to the skeletal system are muscle stiffness, joint stiffness, aching, pain and swelling. With progression there is generalized decalcification and destruction of the joint structures that may lead to ankylosis. The temporomandibular joint may become involved but it is always associated with generalized rheumatoid arthritis.

Until recently, treatment of rheumatoid arthritis has been all but encouraging. The discovery of ACTH and cortisone offers renewed hope. Being a generalized disease, treatment must be diverse with regard to both the body and mind. Exacerbations and remissions are the rule. The prognosis, at least to the present time, must be guarded.

■ *Degenerative Joint Disease*

This is a process associated with the physiologic aging of the tissues of joints, aggravated by strain, microtraumas and deformities, the end result depending on a summation of these factors (Table 4). It occurs chiefly in older individuals and it it unaccompanied by systemic manifestations. The microscopic examination of tissues removed surgically from temporomandibular joints proves conclusively that this disease process is the most frequent cause of internal derangements of this joint. Accordingly, this disease process will be discussed at some length.

Commonly used synonyms are osteoarthritis, degenerative arthritis, arthritis deformans and senescent arthritis. Since

Table 3
Rheumatoid arthritis

Etiology	Speculative. Adrenal cortical dysfunction?
Onset	Insidious or abrupt, accompanied by constitutional symptoms
Age of onset	Usually 20 to 50 years
Involvement	Polyarticular. Often symmetrical
Symptoms	Joint pains, fusiform swelling, stiffness and progressive muscular atrophy. Many prodromes, including mental depression
Roentgen signs	Joint effusion and generalized skeletal decalcification. Destruction of articular surfaces and joint derangement
Treatment	Systemic in nature with supportive therapy. Individualized therapy to involved joints
Prognosis	Guarded. Deformity and ankylosis common

Table 4
Degenerative joint disease

Etiology	Physiological aging and microtraumas
Onset	Insidious. No constitutional symptoms
Age of onset	Usually after fourth decade
Involvement	Monoarticular to few joints
Symptoms	Pain. Limitation of motion. Stiffness
Roentgen signs	Narrowing of joint space. Sharpening of articular margins. Osteophytes. Deformity of condylar head
Treatment	Rest. Physical therapy and mild exercise. Correction of abnormal masticatory mechanics. Analgesics. Surgery
Prognosis	Good. Nondebilitating but irreversible. Ankylosis is not a complication

the changes are degenerative in nature and the word degenerative more accurately describes the pathologic changes, this terminology has been accepted by the American Rheumatism Association. The term arthritis implies inflammation, of which there is little or no evidence in degenerative joint disease.

ETIOLOGY—Despite the fact that this disease has been prevalent throughout the ages, the thorough understanding of its nature has been accomplished only by slow and painstaking observation and investigation.

To understand degenerative joint disease one must bear in mind the anatomic and histologic makeup of joints and the normal physiologic process of joint aging. Articular surfaces of bone are covered with cartilage which is devoid of blood vessels and nerves and possesses a limited ability to repair itself. The wear and tear changes of daily function become accumulative and, if in excess of the limited repair, subjective symptoms may result.

The temporomandibular articulation is immaturely developed at birth but develops in accordance with the function it must serve. The development and eruption of the teeth with the resulting intermaxillary relationships are important factors in the harmonic balance between the condyle and the mandibular fossa. Indeed, the type of joint, anatomically speaking, is the result of this relationship. Once the joint has developed in accordance with functional demands, alteration of the latter is certain to produce an interarticular imbalance. This may occur in a variety of ways such as cuspal interference, malocclusion, overclosure from attrition or loss of teeth, abnormal masticatory habits and so forth. The degree of degenerative changes of the joint structure is in direct proportion to the sum total of microtraumas it receives. It is never monoarticular in the temporomandibular articulations even though it is rare that both sides become symptomatic concurrently or even eventually.

PATHOGENESIS—The pathologic findings of the temporomandibular joints in degenerative joint disease are consistent with that described as the physiologic aging of joints. The initial demonstrable lesion is a softening, roughening and the formation of horizontal cracks in the superficial layer of the articular cartilage and fissures filled with blood which undermine the cartilage and separate it from the subchondral bone (Fig. 2, left). The early degenerative changes are most noticeable

at sites subjected to the greatest pressure and movement. As the disease progresses, the articular cartilage becomes structureless and the subchondral bone surface becomes irregular and broken (Fig. 2, right). Ultimately, portions of the cartilage may be worn away completely, exposing the underlying bone. Such exposed bone becomes dense, polished and eburnated (Fig. 3). Marginal proliferations (known as spurs, lipping, osteophytes and exostoses) and deformities of the condylar head eventually occur. These changes exert a damaging influence on the articular disks and they undergo the same degenerative changes as the articular cartilage. Cracks, fissures and calcification are seen and areas of necrosis develop over exostoses (Fig. 4). The extent of degeneration varies greatly among individuals, with

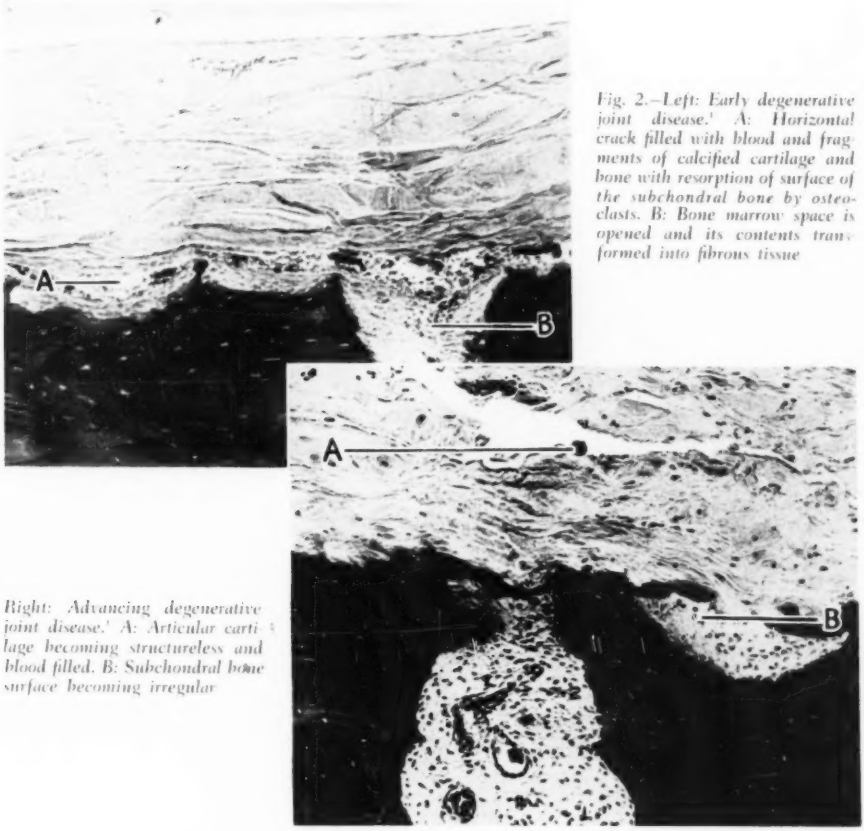

Fig. 2.—Left: Early degenerative joint disease.[1] A: Horizontal crack filled with blood and fragments of calcified cartilage and bone with resorption of surface of the subchondral bone by osteoclasts. B: Bone marrow space is opened and its contents transformed into fibrous tissue

Right: Advancing degenerative joint disease.[1] A: Articular cartilage becoming structureless and blood filled. B: Subchondral bone surface becoming irregular

Fig. 3.—Lipping, exostosis and deformity of head of mandibular condyle

some showing more degenerative articular change at 35 than others do at 60.

SYMPTOMS—The symptoms of degenerative joint disease are local in character. The onset is insidious. The cardinal symptom is pain, which occurs on use and is relieved by rest. Stiffness and limitation of motion after prolonged periods of rest are common complaints. Such stiffness is of relatively short duration in contrast to the joint stiffness of rheumatoid arthritis. There are no specific laboratory abnormalities. Sedimentation rate, blood count, urinalysis and blood chemistry are normal. Lowered basal metabolic rates are found no oftener in this group than in other individuals of corresponding age.

Subjective symptoms and functional disturbances may be absent for many years, although pathologic changes in the joint have been slowly but gradually developing. These cases are particularly responsive to slight trauma that would not produce symptoms in the normal joint. A diagnosis of traumatic arthritis in such cases is in error since the degenerative changes were present before the injury initiated the symptoms. While degenerative change of the temporomandibular joints can occur in the young, it is usually an affection of middle or old age.

ROENTGENOGRAPHIC FINDINGS—One must be extremely careful in evaluating roentgenograms of the temporomandibular joints in degenerative joint disease. In some cases the roentgenographic appearance is normal, while in others many gradations of abnormality may be noted.

As has been pointed out, in the early stages of the disease structural changes are limited to the cartilage which cannot be visualized except by special methods.

The most often observed change noted in roentgenograms is that of joint narrowing owing to degeneration and disappearance of articular cartilage. Following this, small osteophytes appear which originate from the edges of the articular surface and are evident on the roentgenogram as irregular projections extending outward from the joint margins. Inasmuch as the detail of all roentgenograms of this joint is somewhat obscured by superimposition of the bones of the skull, the abundance and extent of these outgrowths are seldom fully appreciated in the roentgen study.

TREATMENT — From a pathologic standpoint this disease is chronic and cannot be cured. Since worn or damaged cartilage regenerates poorly, at best, and since osteophytes cannot be resorbed, such changes, once established, are irreversible and permanent. Nevertheless, much can be done to relieve symptoms and to prevent, or at least retard, progression of the pathologic conditions.

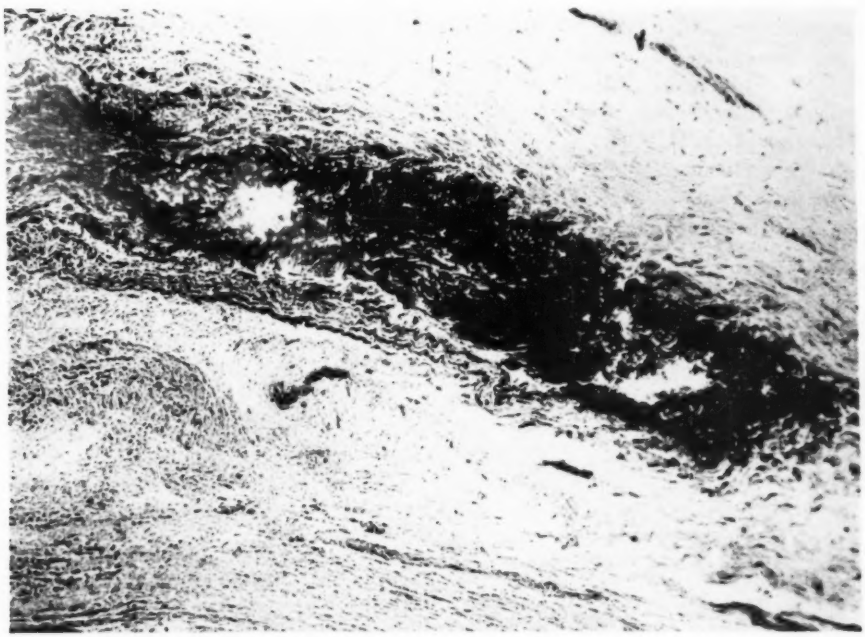

Fig. 4.—Cracks, fissures, calcifications and degenerative changes of articular disk.[1] Areas of necrosis over exostoses.

One of the most important points in treatment is to reassure the patient that the disease is annoying but not serious; that it is not a crippling arthritis. No obvious deformity results from degenerative joint disease as far as the temporomandibular joints are concerned.

Just as arteriosclerotic patients are advised to live within their arteries, so should patients with degenerative changes of the temporomandibular joints be advised to live within their affliction if possible. The treatment of each case must be individualized. A joint with degenerative changes cannot endure much stress or strain; therefore, rest is of primary importance in the treatment of this disease. Complete rest by immobilizing the mandible is unnecessary and seldom of therapeutic value. The patient should be allowed to use the jaw passively and to tolerance, but not to the extent to cause pain. Exercise of a mild nature prevents the formation of fibrous adhesions and decreases the possibility of muscular atrophy. Many patients are obsessed with the idea that their joints will become stiff unless they exercise them continuously; this is not true and the patient should be reassured in this respect.

All factors which tend to cause abnormal or excessive stress or strain on the joints should be corrected. Occlusal disharmonies, even of a mild nature, may result in repeated microtraumas to the joint and be the ultimate cause of the joint change. This is repeatedly demonstrated by the surprising results frequently seen by eliminating cuspal interference. Malocclusion, dental attrition, partial or complete edentia, all of which may cause decreased vertical intermaxillary relationship, should be corrected and normal intermaxillary relationship restored. The nervous type of individual should be questioned regarding bruxism or other nervous habits affecting normal mandibular movement.

In the early stages of treatment most patients benefit symptomatically from heat and massage over the affected part. Heat may be applied in many forms—hot water bottle, hot fomentations, electric pad, short wave diathermy, and so forth. Best results are obtained by diathermy supplemented by other methods at home. Each of these has the effect of increasing the blood supply in the area treated. Massage can be helpful as a follow-up to heat treatments, but it should be avoided, or a least used very gently, if the area is tender. Irritating the tender tissues covering osteophytes may increase the sensitiveness of the area.

Analgesic drugs are helpful in controlling pain but should be used cautiously. Undue damage may be caused in a diseased joint by masking pain. Sodium salicylates and compounds of this drug with Phenacetin are less expensive, safer and frequently more efficacious than most other drugs of this type. Narcotics are seldom, if ever, required to relieve the pain of degenerative joint disease.

Roentgen therapy is of questionable value. If tried, 100 to 150 r, two or three times weekly for a total of three to twelve treatments is recommended. The effect of such therapy probably is analgesic only, without much (if any) effect on the disease itself.

The use of procaine in the ligaments and muscles about affected joints has been tried as an adjunct in therapy. These injections invariably give rise to increased pain, when the effect of the procaine has

worn off; such increase in pain probably is owing to the trauma of injection. In our experience this therapy has been worthless and must be followed by other measures.

Injection of irritating substances such as Sylnasol into the joint to produce adhesions has been reported by some therapists as giving good results. This mode of therapy seems illogical as it produces an inflammatory reaction in all tissues with which it comes in contact, in consequence of which additional injury is introduced to an already damaged joint. It is of interest to know that injection of irritating substances for the purpose of fixing recurrent, dislocating semilunar cartilages of the knee was once used but is now discarded as being ineffective and not entirely harmless. Its use in degenerative changes of the temporomandibular joints should be limited to cases of hypermobility or other conditions in which it is desirable to limit condylar excursion and it should not be substituted for other proved meausres.

Where corrective and supportive treatment has failed to control the pain to the extent that the patient can live with the affection, surgical intervention in the form of meniscectomy is an acceptable procedure. Explanation of the dramatic control of pain by meniscectomy is speculative but it has been pointed out that the meniscus is the only intra-articular structure subjected to frictional attrition that possesses a nerve supply. It was also shown that degenerative changes occur in the meniscus coincident with changes in the other articular cartilages. It is possible that the main source of pain is in the meniscus and its removal eliminates this source of pain. The excellent results that follow excision of the meniscus of the knee joint, where it has undergone degeneration, is well-understood and has proved successful. This same principle of treatment should be applied more generally to the meniscus of the temporomandibular joint if it is impossible to render the patient comfortable by conservative measures.

■ ANESTHESIA

Broadly speaking, all anesthetic agents are protoplasmic poisons. The poison in effect is enhanced when an anesthetic agent is given in excess, when it is incorrectly administered, when an agent is given which accentuates the effects of pathologic processes already existing and when the vital functions of respiration, oxygenation and circulation are not adequately managed. Conversely, these untoward effects in the anesthetized patient may be largely eliminated by choosing the most suitable anesthetic agent and method for a particular patient and administering it correctly and skillfully with due regard to its effects on normal physiologic activity and physiopathologic process.—*R. Charles Adams, "Clinical Research in Anesthesiology," Anesthesiology 11:178, March, 1950.*

Cancer of the gingiva

■ *Ian Macdonald, M.D., Los Angeles*

The gingival mucosa is the third most common site of oral cancer, even though considerably outranked numerically by those malignant neoplasms which arise in the lip and tongue. The mandible is more commonly involved than the maxilla by a ratio of approximately four to one. As in most oral cancer this lesion is more frequent in males than females for a ratio of five to one. Gingival carcinoma fails to display the vagaries of microscopic structure and growth pattern exhibited by lingual cancer, and is more apt to be of intermediate grade of malignancy. Because of the intimate approximation of the thin gingival mucosa to underlying periosteum of mandible or maxilla, some degree of bony involvement is a usual complication even in early cases. In some instances clinical examination shows only a superficial erosion of the mucosa which may be the deceptive surface of a neoplasm infiltrating deeply into the underlying bone. For this reason, prompt biopsy of any erosive process of the gingival tissues is of extreme importance.

■ *Etiology*

The factors commonly regarded as of importance in setting the stage for the possible development of cancer of the gingiva are similar to those for other forms of intraoral cancer. It is my opinion that their order of importance is as follows: dietary insufficiency, specifically, of proteins and the B complex vitamins; oral sepsis, particularly, periodontitis; syphilis, though not as commonly as in lingual cancer; the inordinate use of tobacco. The first two factors seem to be the most important. An adequate diet and a clean mouth offer excellent prophylaxis against this and other forms of intraoral cancer.

■ *Precancerous States*

As in the tongue, leukoplakia is the single well recognized state of tissue abnormality in which cancer may develop, but cancer arising in an established area of leukoplakia is less commonly observed in the gingiva than in the tongue and buccal mucosa. Nevertheless, thickened plaques of leukoplakia may be the soil in which gingival carcinoma develops, and they should be eradicated as a prophylactic measure, and biopsies taken.

Cancer of the gingiva frequently develops in edentulous jaws. It is possible that ill fitting dentures may occasionally act as inciters of hyperplastic epithelial overgrowth, leading eventually to carcinoma, especially if the edentulous state is concomitant with malnutrition.

■ *Differential Diagnosis*

Certain non-neoplastic conditions and several unusual benign neoplasms are ordinarily recognizable without much difficulty.

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■ PYOGENIC GRANULOMA — This growth is a productive, exuberant process caused by trauma to the gingival tissues. The lesion is elevated, discrete, usually a round or ovoid nodule varying from a few millimeters to more than a centimeter in size. The surface is granular or mulberry-like, the nodule is soft in its early stages and firm in its late stages, and may bleed freely in wiping the surface owing to its vascularity. Unlike benign tumors or cancer of the gingiva it is freely movable. The diagnosis should be confirmed by removing the lesion for biopsy. Cauterization of its base usually cures the process.

PSEUDOEPULIS—Pseudoepulis is a designation for a productive, fibrosing reaction in gingival mucous membrane seen in edentulous individuals. It is most commonly observed on the lingual aspect of the mandible in a central location. It is apt to form a linear or flangelike mass of firm or even hard tissue which may appear fixed to the bone. Its differentiation from cancer is the overlying smooth, nonulcerated mucosa, although minute erosions may be present. Many of these lesions require surgical removal to permit refitting of dentures.

HEMANGIOMA—More often seen in infants with accompanying surface "birth marks" of the same nature, these benign tumors of blood vessel origin may arise apparently *de novo* in adults. Their content of blood produces a soft, reddish to bluish fluctuant tumor with a smooth surface.

SQUAMOUS PAPILLOMA—This benign tumor also forms a productive, protruding nodule on the gingiva, usually not more than a few millimeters in diameter. Its surface is granular and noneroded, and it is freely movable. Confirmation of its nature by biopsy is essential.

GIANT CELL TUMOR (EPULIS)—These tumors are of connective tissue origin and arise from the periosteum. Microscopically they are composed of spindle cells with dense collagen fibers and are characterized by multinuclear giant cells. There is some question as to whether they constitute true neoplasms. Malignant change in these tumors apparently does not occur, and they are distinct from those giant cell tumors which occur in the medulla of the mandible and maxilla. The gingival variety form hard, rounded smooth tumors covered by intact mucosa and are fixed to the bone. They grow anteriorly or toward the opposing teeth. If not removed adequately recurrence is inevitable, which necessitates resection of the adjacent bone.

■ *Pathology*

The most common malignant neoplasm of the gingiva is squamous cell carcinoma. The great majority are of grade II or III malignancy. The lesion most often starts in the mucosal epithelium about the tooth socket. The main direction of spread may be inward with early infiltration of bone, or peripheral toward the floor of the mouth or hard palate or buccal sulci. Ulceration of the lesion in its early stage is usual, and there may be an elevated indurated border representing the limits of the lesion. Fixation to the periosteum occurs early, even without actual infiltration. Metastases rarely go beyond the cervical nodes.

■ *Clinical Recognition*

Any erosion of the gingiva which is not clearly traumatic should be biopsied. If there is distinct ulceration, with or without an elevated, indurated advancing edge, the lesion must be assumed to be malignant until it is proved otherwise. Roentgenograms will indicate more than minimum bony invasion, and the pattern of primary cortical erosion and thinning differentiate such bone destruction from the expansile lesions arising in the mandible or maxilla proper and of primary osseous origin.

■ *Treatment*

Present trends are toward surgical treatment of gingival carcinoma. The use of adequate doses of irradiation in such close proximity to bone carries a prohibitive hazard of subsequent radiation necrosis and secondary osteomyelitis of bone. Occasional early lesions of low grade malignancy with little or no involvement of bone and no evident metastases to cervical nodes may properly be treated by wide local resection and preservation of bony continuity. For other than such early processes, ideal treatment consists of a combined radical block dissection of the neck on the side of the lesion to remove actual or possible metastases, with resection of the mandible and adjacent soft tissue.

■ *Prognosis*

Present indications are that radical resection as described above may increase considerably the cure rate of this form of oral cancer. At present results in terms of five year cures are 40 per cent for reasonably early cases and 25 per cent for advanced cases.—*1200 North State Street.*

■ Anesthesia and the Cardiac Patient

The question of whether a patient with cardiac disease will survive the strain of anesthesia and surgery is one which should be resolved only by close consultation between surgeon, cardiologist and anesthesiologist. Having once decided that the expected benefits outweigh the risk, it is then the duty of the anesthesiologist to select the agent or agents and outline the management of the case in such a way that there will be as little variation from normal physiology as possible. In making his choice the anesthetist should keep in mind the real danger of sudden death, with its attendant burden of proof that the choice was justified.—*Forrest E. Leffingwell, "Choice of Anesthesia in Heart Disease," Annals of Western Medicine and Surgery 4:244, May, 1950.*

Respiratory depression following induction of anesthesia with thiopental sodium: *report of case*

■ *A. E. Dodds, B.D.S., B.Sc., B.Ed., Johannesburg, South Africa*

The two most common complications of thiopental sodium (Pentothal) anesthesia mentioned in the literature are laryngospasm and respiratory depression. Laryngospasm, when it does occur, is usually more severe under thiopental anesthesia than it is under anesthesia produced by any other drug. This severity is attributable to the respiratory depression which is a common feature of thiopental anesthesia. Viewed from a physiologic aspect the spasm is essentially a life-saving reflex. Where it occurs as a reflex action from a pain stimulus or an unknown factor[1] the explanation of its occurrence is as yet not clear.

While an alarming incident during anesthesia, laryngospasm is less disturbing than severe respiratory depression for several reasons.

1. Its occurrence is probably far less common than is generally inferred from frequent references to its dangers. Morris[2] encountered only 6 cases of laryngospasm in a series of 2,038 cases under thiopental anesthesia. Grant-Whyte[3] reports one case of minor respiratory depression and none of laryngospasm during a series of 500 cases under thiopental anesthesia.

2. The causes of laryngospasm are for the most part known, and if they are avoided the development of serious spasm is unlikely.

3. The treatment of laryngospasm compared to that of respiratory depression is relatively simple and certainly more rational. If it is carried out expeditiously the likelihood of a fatality occurring is remote.

4. Cardiac failure, the real danger during laryngospasm, will only occur in patients with a poor cardiac reserve, or where the questionable condition of status lymphaticus exists.

A perusal of available literature discloses only 2 cases of severe respiratory depression under thiopental sodium. In both instances recovery was reported, but it is not known how many cases, under similar circumstances, terminated fatally and were not recorded in the literature.

In the case described by Wilson[4] 0.7 Gm. thiopental sodium was used for removal of an

From the Dental and Oral Hospital, University of the Witwatersrand, Johannesburg, South Africa.

1. Minnitt, R. J., and Gillies, J., *Textbook of Anaesthetics*. Edinburgh: E. & S. Livingston, Ltd., 1948, p. 23.

2. Morris, L. E., Sodium Pentothal: Precautions and Safeguards Which Should Be Observed in Its Use. *Ohio State M. J.* **43**:944 (Sept.) 1947.

3. Grant-Whyte, H., Pentothal Sodium Anaesthesia in Dentistry. *S. African D. J.* **19**:307 (Oct.) 1945.

4. Wilson, J. R., A Case of Cerebral Anoxaemia Occurring as the Result of Anoxia During the Administration of Sodium Pentothal. *Brit. D. J.* **80**:22 (Jan.) 1946.

impacted unerupted third molar tooth. After an incision had been made the patient stopped breathing and became cyanosed. After artificial respiration with oxygen and 7 per cent carbon dioxide for an hour, the patient resumed breathing. "That night the patient was semiconscious and violent jactitations occurred. The following morning he was drowsy and complained of complete blindness." After seven days he had "pins and needles" in his right hand which went on to tremors and spasms of the flexor muscles of the forearm. Subsequently the left arm and leg were similarly affected. His sight returned, and was just less than normal after 46 days.

In the second case,[5] an infant of three months received 10 cc. of 2.5 per cent thiopental. The patient became cyanosed and respiration ceased. Oxygen was given but the child was almost moribund before he began breathing again. Twenty minutes afterwards there was sudden failure of respiration and pulse. There was blood-stained fluid in the bronchi. Methedrine was administered and the child recovered.

While these cases are not entirely similar to the case described here, the main issue to be contended with in each instance was respiratory failure. There is no doubt that respiratory depression is far more disconcerting than laryngospasm. The cause is seldom evident; the treatment is rarely routine; the outcome is never sure.

REPORT OF CASE—The patient, a white male, aged 32, was admitted to the University of the Witwatersrand Dental Hospital for treatment of a painful and swollen lower jaw. On January 13, 1951, while walking, the patient had been assaulted and struck on the lower jaw. He had managed to walk home. Two days later his jaw was painful and swollen. The patient related that at the age of 14 he had fallen from a horse and damaged three ribs at their spinal attachment. No further details of this injury could be elicited, and there was no history of any illness or familial condition which might have a bearing on the case.

The left mandibular region was swollen; a hematoma was noticeable in the floor of the mouth. On palpation of the swollen area, as well as on percussion of the lower left cuspid and bicuspid teeth, pain was elicited. Unnatural mandibular movement was apparent. These factors led to a diagnosis of mandibular fracture in the region of the left cuspid tooth. The diagnosis was confirmed by extraoral roentgenograms; there was no evidence of a fractured skull.

GENERAL EXAMINATION—The patient was of average build. He showed a slight hunch in the lower half of the thoracic spine on the right side, tending to scoliosis. It was noticeable that he lifted his feet higher than necessary when walking. His step also lacked normal spring and, in general, resembled a tabetic gait. There was, however, no further evidence of tabes dorsalis.

Percussion and palpation indicated that the heart was of normal size; the lungs were normal. The pulse was full and strong and the pulse rate 80 per minute. Heart and lung sounds were normal. There was no evidence to suggest disease of the circulatory or respiratory systems. The diastolic blood pressure was 85 and the systolic, 125. The patient's temperature varied from 98.4 to 99 degrees. Analysis of the urine revealed a specific gravity of 1.025, an acid reaction and no evidence of albumen or sugar.

TREATMENT—The immediate plan of treatment was reduction and immobilization of the fracture under general anesthesia. On January 18, the patient was given preoperative medication of ¼ grain Omnopon and 1/50 grain atropine by subcutaneous injection an hour before the operation. He was conscious and appeared normal when admitted to the operating room at 10:30 A.M. A 5 per cent solution of thiopental sodium was slowly injected into the median cubital vein. The total volume of solution injected was 7.5 cc. After 15 to 20 seconds, respiration ceased and within two or three minutes the patient became cyanosed. Oxygen under pressure was administered immediately.

5. Stiff, I.: Resuscitation From a Seemingly Hopeless Situation, Newsletter, *S. African Soc. Anaesthetists* 2:46 (Jan.) 1948.

from the Boyle's anesthetic apparatus (without carbon dioxide absorber attachment). Cyanosis rapidly disappeared. Six minutes after respiration had ceased the patient's pulse was full and the rate 160 per minute. The diastolic blood pressure was 100, the systolic, 130. The pupils were normal in size and reacted to light. As there was no sign of recovery a mixture of 8 per cent carbon dioxide and 92 per cent oxygen was administered, but without any apparent effect.

At 10:50 A.M. an intratracheal tube was passed through the nose, and the pharynx was packed off. Artificial respiration was continued by alternately squeezing the rebreathing bag with the respiratory valve closed and applying pressure to the abdomen with the respiratory valve open. At 11:00 A.M. 2 cc. of nikethamide was injected intravenously, without visible response. Twenty minutes later, and again after 15 minutes, 3 cc. of picrotoxin was administered intravenously. There was no sign of respiratory recovery. Pulse, eye signs and blood pressure remained unchanged. Lumbar puncture revealed no increase in pressure in the spinal fluid. At 12:30 P.M. the patient was removed from the operating room and transferred to an iron lung. While in the iron lung he was examined by a neurosurgeon. The pupillary reflexes were normal. There was no sign of Babinski's reflex. There was no spasticity of the neck muscles, or of the arms or legs. A cisternal puncture was not attempted. At 2:00 P.M. twitchings of the calf muscles were noticed. After a few minutes these twitchings took on the character of convulsive movements, accompanied, however, by movements of the head, arms and legs that were definitely of a voluntary nature. This led to the assumption that the respiratory mechanism might also be functioning. The iron lung was, therefore, stopped—at 2:15 P.M., which was almost five hours after the initial cessation of respiration.

The surmise proved to be correct. The patient had resumed breathing, but he appeared bewildered and reacted violently. The intratracheal tube was withdrawn and the patient was removed from the iron lung. He was extremely difficult to handle and had to be strapped to the bed. During this time he shouted incoherently and pleaded with some unidentified person for mercy. Because of extreme exertion his color rapidly deteriorated and the unruliness passed on to delirium. Oxygen was administered with difficulty, but immediately improved his color as well as his unruliness. After a short while he asked for water. He was allowed a cupful, and was urged to control himself. This he did, and gradually settled down into a deep sleep. However no sooner was the oxygen withdrawn than he rapidly became cyanosed. Respiratory movements were slowly becoming more feeble.

At 5:00 P.M. respiration was so feeble that even in an atmosphere of 100 per cent oxygen the patient's color was greyish, and by this time his sleep appeared to have merged into a state of coma. At 5:20 P.M. he was again transferred to the iron lung. In the process he became deeply cyanosed. A pulse beat could be palpated only with difficulty. An intratracheal tube was immediately passed and oxygen was administered under pressure. Color as well as pulse improved, and returned to normal as soon as the iron lung was started. By 7:00 P.M. the patient was conscious. He answered to his name and scrutinized the persons around him.

At 7:30 P.M. the iron lung broke down. The patient, however, was conscious, and his breathing was better than it had been on the occasion of his previous temporary recovery; in addition he was much more cooperative. He was transferred by ambulance to the Johannesburg General Hospital, where another iron lung was available. By 10:45 P.M., more than 12 hours after the initial cessation of respiration, the patient was able to maintain a good color without the aid of the iron lung and pure oxygen. He slept reasonably well from 11:30 P.M. until 7:00 A.M. the next morning. By 7:30 A.M. he had recovered completely, and asked for food. He had no recollection of the previous day's experience.

A thorough roentgenographic examination of the base of the skull and cervical spine was made immediately after his recovery. No sign of any abnormality whatever was detected. The mandibular fracture was subsequently treated under local anesthesia.

At the time of writing there is no evidence

of cerebral damage having followed this disconcerting episode.

COMMENT—Three etiologic factors, separately or collectively, have been considered as possible causes of the prolonged respiratory depression.

1. Increased intracranial pressure. So far as maxillofacial injuries are concerned the usefulness of lumbar puncture in suspected cases of increased intracranial pressure is questionable. Because of the likelihood of an impacted medulla oblongata in skull and cervical spine injuries, an increased pressure in the cerebral fluid is more likely than increased pressure in the spinal component. Cisternal puncture is not, however, a procedure lightly embarked upon. Even in the absence of information that a cisternal puncture would have provided, in view of radiological and clinical evidence, the possibility of increased intracranial pressure would be unlikely.

2. Central lesion. The slightly ataxic gait and the history of a fall at the age of 14, might point to the existence of a central lesion. However the neurologic examination failed to disclose any such factor.

3. Idiosyncrasy to thiopental. There remains the possibility that respiratory depression might have resulted from an abnormal reaction, both in intensity and duration, to thiopental. Thorough examination having failed to reveal a more likely explanation, the untoward occurrence is most feasibly accounted for by an idiosyncrasy on the part of the patient to the anesthetic agent.

Bifid tongue: *report of case*

■ *H. L. Hubinger, D.D.S., Saginaw, Mich.*

A case of bifid tongue is reported that provided an additional interesting observation as regards developmental phenomenon.

A bifid tongue, or tip of the tongue, is a developmental anomaly that is rare in occurrence.

Embryologically the body and apex of the tongue originate as three prominences on the oral aspect of the mandibular or first branchial arch. There are two lateral lingual prominences, one on each side; the third prominence appears between these two and somewhat posteriorly; it is the tuberculum impar.[1] Failure of any portions of the lateral halves to unite results in bifurcation of the tongue. Failure of the lateral halves in the posterior portion to fuse before the tuberculum impar becomes interposed between them results in the anomaly known as median rhomboid glossitis.

REPORT OF CASE—The patient, a negro girl, aged 3, was referred by a physician for repair of a bifid apex of the tongue and removal of an adjacent pedicled growth. The defect had been present since birth. The adjacent pedicled mass had gradually increased in size.

The patient was well nourished and had no other obvious congenital physical defects. Examination of the tongue revealed a rather

1. Orban, B., editor, *Oral Histology and Embryology* St. Louis: The C. V. Mosby Company, 1944.

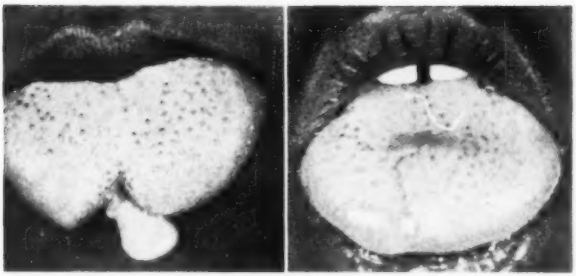
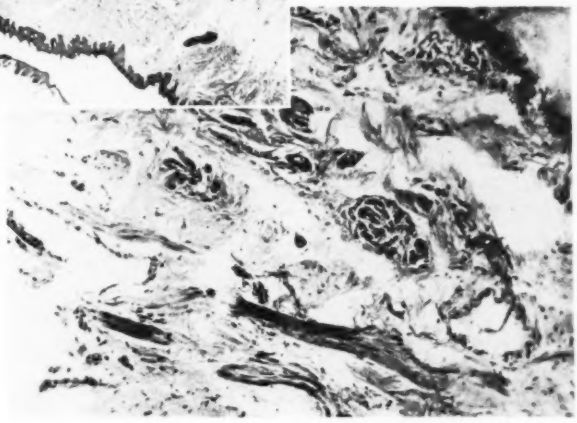


Fig. 1.—Left: Bifid tongue with associated polypoid growth of tongue tissue. Right: Appearance of tongue one month after operation

Fig. 2.—Left: Low power photomicrograph of polypoid tissue showing presence of tongue musculature at arrow



Right: High power photomicrograph from same specimen showing tongue muscle designated at arrow

small bifurcation of the tip. There was an ovoid growth of tissue attached to a rather small pedicle which, in turn, was attached to the inferior surface of the right apex of the tongue. The base of the pedicle was located near the margin of the bifurcation. The growth had the appearance of a solid soft tissue papilloma or fibroma (Fig. 1, left).

The patient was admitted to the hospital on August 20, 1949. Under open ether anes-

thesia a diamond-shaped incision was made about the base of the pedicle and the growth was removed and sent to the laboratory for examination. Full thickness excisions of the bifid margins were done leaving a V-shaped defect. The mucous membrane was undermined and the wound closed with interrupted and mattress silk sutures. Two small lead buttons were used with a mattress suture near the anterior portion of the wound, on both the inferior and superior surfaces, for retention of the wound margins.

The sutures were removed on the fourth postoperative day. The wound appeared well healed when the patient was last seen one month later, September 27, 1949 (Fig. 1, right).

PATHOLOGIST'S REPORT—Grossly, the specimen was a polypoid mass of epithelial covered tissue, measuring 1.2 cm. in length and 6 mm. in diameter. Microscopically, the specimen was covered by a thick layer of squamous epithelium. The body of the specimen consisted of a mixture of fibrous tissue and muscle, with a predominance of the former (Fig. 2). The polyp was well vascularized and showed a great many dilated endothelial lined vascular channels. The presence of the large blood vascular channels appeared to be part of the vascularity of the specimen rather than any indication of a tumor derived from blood vessels.

The pathological diagnosis was papilloma of the aberrant tongue tissue.

COMMENT—The presence of muscle, well within the body of the bulbous portion, suggested that the growth arose from tissues, perhaps a small nubbin, that, at one time, was destined to become normal tongue tissue. The epithelial covering was uniformly thick about the circumference of the growth, but there were no long rete pegs or heavy epithelialized areas that are often observed in the classical papillomas. Macroscopically the presence of a pedicle would suggest a papilloma. The bulk of the tissue consisted of fibrous tissue with considerable vascularity.

SUMMARY—A case of congenital bifid tongue is presented. The associated polypoid growth apparently represents hyperplasia of aberrant tongue tissue.—*501 Second National Bank Building.*

■ TREATMENT OF PERIODONTITIS

Periodontitis is not a disease from which a patient can be considered "cured" following a course of therapy—unless that therapy be the extraction of the teeth. It is a disease which must be continually kept in abeyance, and, therefore, one which demands continued prophylactic measures. Because the periodontist is faced with a problem of maintaining a periodontium at optimal function and repair, he necessarily must adhere to sound biological principles in the treatment, utilizing the accepted studies on tissue metabolism in health and disease.—*Dickson G. Bell and Robert W. Rule, Jr., "The Periodontal Lesion," The Journal of Periodontology 21:70, April, 1950.*

Hypermobility of the temporomandibular joints: *report of case*

■ *Irving F. Kammen, D.D.S., M.S.D., Cleveland*

A 16 year old boy was referred by his physician on May 6, 1948, with the complaint of pain and difficulty in opening his mouth.

For a considerable length of time the patient had been troubled with a faint cracking in the temporomandibular joints. One morning approximately five weeks previously he awakened with his mouth locked in a half-open position, and this has occurred each morning since. If he tried to open wider there was severe pain in the left temporomandibular joint. He was able to reduce the dislocation by manipulating his jaw. Accompanying the reduction was a loud cracking in the joint. There was pain and cracking on opening and closing. The pain would subside, leaving only the cracking.

There was good mobility palpable in both joints, with a knocking palpable in the left joint. Through a stethoscope the cracking was audible in the left joint, but not in the right. The patient could open his mouth approximately 55 to 60 mm. He was able to reproduce the locked position that troubled him in the morning. With the mouth open approximately halfway, he could shift the mandible to the right dislocating the left joint and locking the jaw in this abnormal position. By manipulating his jaw he could bring it back into proper position. All his teeth were present with the exception of the lower right second bicuspid and the third molars. His bite was fair with a tendency toward a cross-bite occlusion in the posterior region.

Roentgenographic examination revealed considerable asymmetry of the temporomandibular joints. The left showed a deep fossa with a well developed anterior tubercle and a normally formed articular process of the mandible. The articular process, in the closed mouth position, was within the fossa but posterior to the tubercle (Fig. 1, left). In the open mouth position a shift of 2 cm. forward occurred with the process well anterior to the tubercle (Fig. 1, right).

The right fossa was shallow and flattened and elongated in the sagittal dimension, with hypoplasia of the tubercle. This deformity of the fossa was apparently the result of a broadening, flattening and irregularity of the articular surface of the articular process. Because of this unusual configuration, the excursion of the condyle anteriorly was increased slightly more than 2 cm. when the mouth was opened (Fig. 2, left). Also the articular space appeared to be widened in the closed mouth position (Fig. 2, right).

IMPRESSION—There was deformity of the articular process of the right mandible and the glenoid fossa of the right temporal bone, with increased excursion and widened joint space, owing to a developmental abnormality, possibly attributable to an osteochondrosis or to unrecognized trauma during growth. The left temporomandibular joint showed increased excursion, doubtless associated with functional abnormality of the right joint.

TREATMENT AND COURSE—With the subluxation, or luxation, of the left joint probably owing to the abnormality in the right joint, it was doubtful if injections of sclerosing solution would be of value, but it was deemed worthy of trial.

On May 15, 1948, 8 minims of 5 per cent Intracaine in oil was injected into the temporomandibular joints. The patient experienced little pain or discomfort. A check-up a week later showed some improvement. The dislocation and pain, which heretofore had occurred

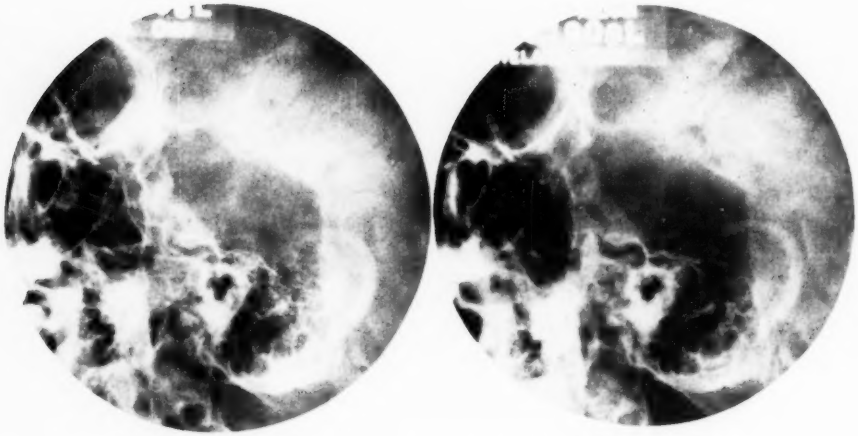


Fig. 1.—Left: Left temporomandibular joint, with mouth closed, showing well developed, normal joint. Right: Left temporomandibular joint, with mouth open, showing head of condyle anterior to the tubercle

each morning, had ceased although the patient still experienced the cracking. The maximum opening of the mouth at this time was 45 mm.

Two weeks after the first injections, both sides were injected with 5 minims of Intracaine. Upon examination three days later, the maximum opening of the mouth was 35 mm. The patient experienced no pain or discomfort; there was slight cracking in the left joint.

On June 12, there was bilateral cracking. The patient experienced no pain, but had slight difficulty opening his mouth in the morning. Maximum opening was 45 mm.

On June 19, 5 minims of Intracaine was injected into the left joint. Two days later the bite was very slightly open in the left posterior region, there was no cracking or pain, and the maximum opening was 40 mm. The open bite subsided in a few days and the maximum opening increased to 45 mm.

By July 3, the patient's condition was good, with the exception of slight cracking in the right joint. An attempt was made to eliminate this cracking by injecting Intracaine into both joints, 6 minims in the right and 3 minims in the left.

The slight cracking shifted to the left side, and one week later, 4 minims of Intracaine was injected in the left joint. One month later, August 9, 4 minims was again injected in the left side. The cracking disappeared, the opening was approximately 35 mm., and there was no pain.

Following this injection the patient's progress was observed for a period of four and one half months. During this time a slight cracking developed in both joints, and occasionally he experienced a dislocation with locking on awakening, but no pain. There was a maximum oral opening of 47 mm.

On December 27, 1948, four and one-half months after the last injection, both temporomandibular joints were injected with 4 minims of Intracaine. This was the seventh set of injections since May 15. The cracking and subluxation stopped. The oral opening was 37 mm.

Periodic follow-up examinations were continued, the last one being in December, 1949, one year and seven months after treatment was instituted. There was an occasional slight cracking in the left temporomandibular joint when eating; no luxation or locking on awakening.

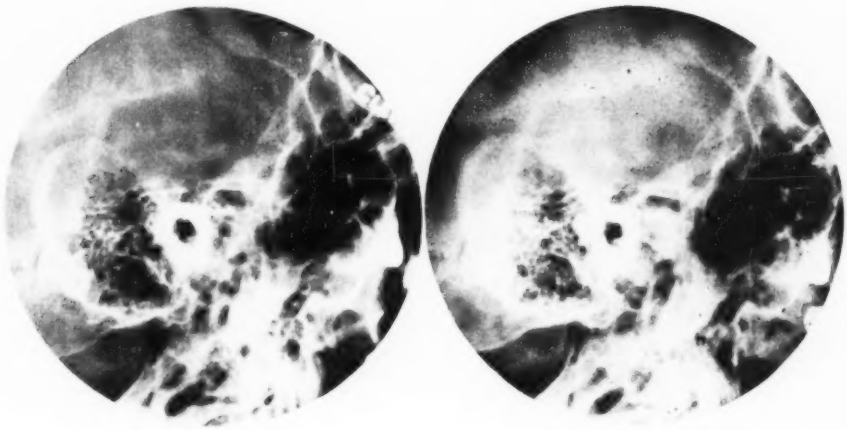


Fig. 2.—Left: Right temporomandibular joint, with mouth open, showing shallow flattened fossa, and hypoplasia of the tubercle. Right: Right temporomandibular joint, with mouth closed, showing widened articular space

and no pain. The maximum oral opening was 50 mm.

COMMENT—This case is of interest because of the asymmetry of the temporomandibular joints. The left joint was normal and well developed anatomically, while the right joint was greatly deformed. Under this circumstance the assumption could be made that any complaint clinically would be associated with the malformed right side. Apparently, the shallow and flattened fossa, and the hypoplasia of the anterior tubercle permitted extreme mobility and subluxation or luxation of the joint without the cracking and knocking usually occurring with hypermobility and dislocation. Because of the functional abnormality of the right joint greater stress and strain were placed upon the structures of the normal left temporomandibular joint. The resulting trauma produced a hypermobility, in this case clicking, pain and luxation in the normal joint.

Although the treatment did not produce perfect results, in view of the anatomical deformity of the right joint, the amount of improvement obtained was gratifying. Observation of the patient since the last injections on December 27, 1948, shows that the lax ligaments have been tightened and the major portion of his difficulty eliminated. Because of the anatomical deformity of the right joint and the accompanying strains placed on the left there is the possibility that over a period of time the ligaments may stretch and a relapse occur. Only time will tell, and close observation and periodic examinations will be continued to note future changes in the temporomandibular joints.—736 *Rose Building*.

■ GREAT MEN

Great men are like meteors, which shine and consume themselves to enlighten the earth.—*Napoleon*.

Accessory jaw bones.
report of case

■ *P. T. Smylski, D.D.S., Hamilton, Ontario, Canada*

A report of a rare developmental anomaly is presented including surgical removal of the anomalous structures.

On January 5, 1950, a girl, aged 2 years and 9 months, was given a dental examination (Fig. 1). An accessory or supernumerary tooth was erupting from the left buccal tissues approximately opposite the maxillary deciduous second molar, in a horizontal position (Fig. 1). On the right side a slight point of firm, apparently fibrous or cartilaginous, tissue was palpated in approximately the corresponding region. Both of these structures were readily movable by finger pressure within the soft tissues enveloping them. All deciduous teeth were present. There was extreme underdevelopment of the mandible, and teeth were in Class II (Angle's) occlusion. The child's speech was not distinct, probably because of the mandibular retrusion. Mentally she appeared normal and subsequent observation seemed to confirm this.

HISTORY—The child was born in May, 1947. It was observed at birth that she had a receding chin. A special rubber nipple with a large opening and a bottle were used to feed her. She could not be nursed. She gained weight normally. At time of birth there was a hollow in the sternal area and care had to be taken in laying her down as her breathing was affected. This hollow has since filled in and felt normal at time of examination. Clavicles were present.

At the time of her birth her mother's age was 38 and her father's age 48. Both were normal. There were seven children in the family. The previous baby was stillborn and was an anencephalus. All others were normal. The mother, during the early months of pregnancy, had been severely ill and in a hospital for a few weeks. She had secondary anemia, and required blood transfusions as well as other treatments. This was complicated with toxemia of pregnancy.

ROENTGENOGRAPHIC EXAMINATION—On June 22, 1950, a maxillary periapical examination revealed a normal complement of deciduous teeth. A lateral view (Fig. 2), revealed an osseous structure somewhat rectangular in shape and bearing three teeth, one of which had already erupted through the buccal tissues.

On October 7, 1950, lateral views were taken with the point of the cone paced as far back as possible at the opposite corner of the mouth and at right angles, approximately, to the object and film. These revealed an osseous structure on the left side bearing three teeth, one of which had erupted (Fig. 3, left). A similar view of the right side revealed an elongated osseous structure, but no tooth formation (Fig. 3, right). Roentgenograms of the temporomandibular joints, taken on March 15, 1951, showed normal condyles for a child of this age. The coronoid process on the left side appeared underdeveloped. Permanent dentition showed normal development at this stage. The erupted accessory tooth on the left side was removed on January 22, 1951, because of caries.

TREATMENT—The patient was brought in periodically for observation. As caries developed in the deciduous teeth restorations were done. The accessory tooth on the left side developed caries and was removed under general anesthesia, on January 22, 1951. During these visits the child was cooperative and left the impression that she was mentally normal. The structures were observed to be not as easily

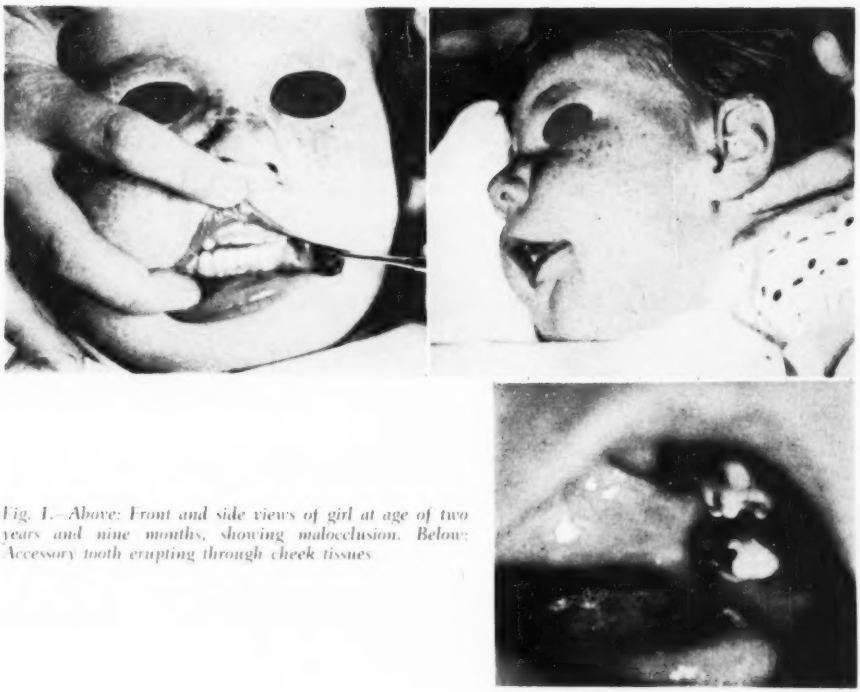


Fig. 1.—Above: Front and side views of girl at age of two years and nine months, showing malocclusion. Below: Accessory tooth erupting through cheek tissues

movable as a year previously. On consultation with an orthodontist it was considered advisable to eliminate the anomalies as they might possibly be hindering normal development of the mandible, and could be a source of further disturbance once orthodontic measures were undertaken for stimulation of mandibular development and the correction of occlusion.

The patient was admitted to the hospital on March 27, 1951, for the operation the following day. She was given 400,000 units of penicillin the night before the operation and again the next morning. Codeine, ¼ grain, and atropine, 1/300 grain, were administered an hour before the operation.

On March 28, the operation was performed under a general anesthetic of ether and vinyl ether administered nasotracheally. The approach was intraoral. Local anesthetic, 1½ per cent butethamine hydrochloride with 1:100,000 epinephrine, was injected around the bony growths for hemostasis. A vertical incision was made over the region of the palpated osseous structure on the right side, anterior and medial to the anterior border of the ramus. The incision was deepened with a sharp scalpel until it was possible to raise the periosteum off the structure with a periosteal elevator. Elevation and retraction of the periosteum was continued to its head. A bent elevator was necessary to get back of the head to sever the firm fibrous tissue closely uniting this mass to the base of the skull. Blunt dissection and elevation was employed throughout to avoid possible injury to blood vessels and nerves. The tissue enveloping the anomaly was all muscle tissue. The temporal and the internal pterygoid muscles are in this region. After the

object was thoroughly freed from surrounding tissue it remained firmly attached at its head by firm fibrous tissue to the base of the skull. A tonsil snare was slipped over the mass and finally over the fibrous attachment. However, it was not possible to sever the connecting fibers immediately. Further dissection was employed using the tonsil snare to hold and draw on the bony mass. This proved effective and the structure was removed.

A similar method of dissection was employed on the right side. A pair of tooth forceps was used to grasp and pull on the structure after it was freed from the surrounding soft tissue but only resulted in fracturing it. The tonsil snare was slipped over the mass and with

Fig. 2.—Lateral view showing anomalous structures superimposed

Fig. 3.—Left: Lateral view of the left side, showing an osseous structure bearing three teeth, one of which had erupted. Right: Lateral view of the right side, showing an elongated osseous structure, but no tooth formation

continued dissection and drawing on the tonsil instrument the structure came away in its entirety.

Catgut sutures were used to close the wounds. Penrose rubber drains were inserted and sutured to the cheek with silk.

POSTOPERATIVE TREATMENT — Penicillin was administered daily for eight days and proper mouth care was rendered daily. There was hardly any bleeding after the first day and the swelling was only moderate. The patient was discharged from the hospital on April 5.

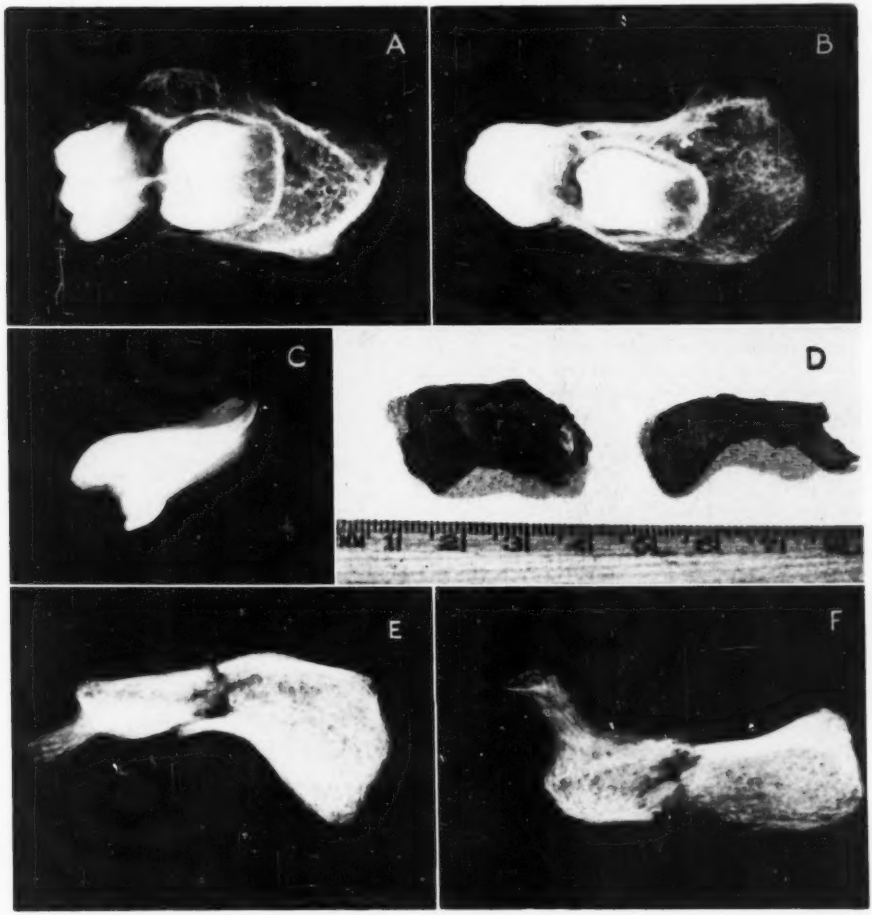


Fig. 4.—A and B: Views of specimen removed from the left side. C: The tooth which had been removed previously. D: Photographs of the structures removed from the left and right sides. E and F: Views of specimen removed from the right side

On April 20, the patient seemed cheerful and normal in attitude. According to her mother there were no complaints of pain or discomfort.

GROSS DESCRIPTION OF SPECIMENS—The left osseous structure was roughly rectangular in contour, approximately 3 cm. in length and 1.5 cm. in width. The anterior end was rounded and pointing toward the oral cavity. This end contained a tooth which was still in the osseous structure with a thin covering of bone. During the operation the tooth fell out. According to the roentgenographic study another tooth was buried deeper in the mass. The head of the structure was expanded laterally, resembling the expansion of the condylar head. This head was attached firmly by a limited area of fibrous tissue to the infratemporal surface of the temporal bone anterior to the articular tubercle. Roentgenograms taken of the specimen are shown in Figure 4, *A* and *B*.

The tooth located in the anterior end of the left specimen had a well developed crown about 1 by 0.7 cm. with four distinct cusps, which seemed to suggest a mandibular tooth.

The crown of the tooth removed previously had developed caries and the anatomy of the cusps was lost. The roots were about a centimeter in length, grooved, and divided at the apical third to make it appear there were two roots—a mesial and a distal, if related to a mandibular tooth, the mesial being the wider. The crown, however, was small, 0.4 by 0.6 cm., and of less value in identifying it (Fig. 4, *C*).

Photographs of the two specimens are shown in Figure 4, *D*.

The anterior half of the right osseous structure was about 3 cm. in length and 0.5 cm. in width from the lateral view. The distal or posterior half of the specimen expanded to a width of about 1.5 cm. Anteriorly there was a small process about 1 cm. in length and 0.5 cm. in width, directed medially. At its head this mass was also closely attached by firm fibrous tissue to the infratemporal surface of the temporal bone anterior to the articular tubercle.

Roentgenograms of this specimen are shown in Figure 4, *E* and *F*.

Microscopic studies were not made as the bone appeared normal.

These rare anomalies would probably be related to the formation of the two halves of the mandible from membranous bone replacing Meckel's cartilage. Duplicity in organogenesis is not uncommon. This is perhaps an instance of a teratological process of duplication of these particular parts.

COMMENTS—The position of these anomalous structures, their relationship to the mandibular condyles and the cuspid formation of the teeth of the left side indicate that these probably are parts of an accessory mandible.

As the mobility of these anomalous accessory structures had decreased greatly within the year previous to the operation it is probable that eventually they would have become fused to the base of the temporal bone. This might have caused the underdevelopment of the mandible to become more pronounced. Removal of the anomalies would also be more difficult.—*681 Main Street, East.*

■ PERSPECTIVE

To look at his picture as a whole, a painter requires distance; and to judge of the total scientific achievement of any age, the standpoint of a succeeding age is desirable.—*John Tyndall, "Science and Man," Fragments of Science. The Scientific Monthly 72:232, April, 1951.*

Let's be reasonable

It is well known that the possibilities for the cure of malignant disease increase with early diagnosis and treatment. In the zealous effort to control this disease various agencies of the healing arts have utilized all forms of public communication to urge people to present themselves earlier for cancer diagnosis. The professions, too, have been deluged with propaganda to acquaint the practitioner with the various aspects of cancer and to keep him constantly aware of its possible presence.

The result of this widespread publicity has been the creation of morbid, unreasonable fear and consequent anxiety. Once the firm conviction is established in the minds of some patients that they have, or may have, the dreaded disease, no statement to the contrary and no amount of reassurance by the procession of doctors they consult can overcome this fear-anxiety state. Consequently, what was started as a vital public health project has boomeranged to become in itself a cause of illness.

Fear technics, exaggeration and confusion which have characterized much of the education on cancer should be replaced by a reasonable approach to the problems with full understanding of the possibilities of treatment and cure. The profession in particular must be sufficiently acquainted with the clinicopathologic characteristics of neoplastic disease to differentiate the potentially dangerous lesion from that which is entirely innocuous. Members of the dental profession, for example, are prone to label most white lesions of the oral mucosa as leukoplakia. Warnings, such as "strict observation," "stop smoking," "precancerous," suddenly destroy a patient's mental tranquility. Intelligent thinking gives way to anxiety, panic and hysteria, and the assumed inevitable looms before the patient as a formidable blackness. Few professional men who so readily lift the warning finger and shout the dread word "cancer" have extended their education sufficiently to distinguish the multiple clinical entities with similar but significantly different histologic features.

The important feature of leokoplakia is its malignant dyskeratosis. Degeneration is already under way, and it is truly a precancerous lesion. Simple hyperkeratosis and lichen planus clinically simulate leukoplakia but lack its malignant potentialities. Our daily practices include many patients presenting numerous deviations from normal oral mucosa. How many of these lesions, over a period of many years, degenerate into cancer? Is the alarm which we have created in the minds of these patients justified? Let's be reasonable!—*Herbert J. Bloom.*

■ Side Effects of Antibiotics

Q.—One of my patients developed a rather severe infection following extractions and was treated successfully with a course of aureomycin. After about 10 days, when the infection had completely subsided, she developed a sore mouth and some white plaque lesions inside the cheeks. Why did this condition develop?—*J. R. H., Colorado Springs, Colo.*

A.—When antibiotics are used the entire flora of the mouth is disturbed as well as knocking out the pathologic invaders. Prolonged use of antibiotics, which have a wide spectrum of antimicrobial effect, leaves ample room on oral tissues for the yeasts and fungi not inhibited by the antibiotic. For these reasons the symptoms described in the patient are from a monilial infection. Such lesions are best treated with one of the detergent types of germicides. It is well to be aware of these side effects of the antibiotics and to avoid prolonged use beyond periods of definite indication.

■ Treatment of Flaps Over Partially Erupted Third Molars

Q.—What is your advice on the problem of persistent gum flaps over the distal portion of partially erupted lower third molars?—*R. A. W., Pontiac, Mich.*

A.—Decisions in management must depend upon the eruption state and potential behavior of the third molar in the future. When the patient's age, clinical examination and roentgenograms indicate probable full eruption and function of the tooth, a conservative plan is followed. It only may be necessary to treat one or two episodes of pericoronitis, or the flap may be excised. In most cases, however, there will be inadequate space to accommodate the third molar and it will remain dormant in the state of partial eruption. Then any attempts at flap excision will be followed by regeneration and the condition will be troublesome with the threat of severe infection until the third molar is extracted.

■ Check-ups After Removal of Adamantinoma

Q.—How long should a patient be observed after the removal of an adamantinoma from the mandible?—*A.K., Baltimore.*

A.—These patients should be checked at six month intervals by roentgenographic examination for the rest of their lives. We have seen recurrences as much as 30 years after the removal of adamantinoma of the mandible. In our series of cases, recurrences have been noted in about 25 per cent of the cases. Out of a total of 60 cases, 6 of the recurrent lesions, or 10 per cent, showed adamantinocarcinoma. The initial treatment should be radical and the follow-up should be continuous and careful.

■ Effect of Prolonged Fixation for Treatment of Fractures

Q.—Is there any danger of permanent damage being caused to a normal temporomandibular joint from prolonged fixation for treatment of fractures?—*H.S., New York.*

A.—No. This possibility is practically nonexistent. We have had 2 cases on our service with unilateral ankylosis of the temporomandibular joint. One had fixation for a period of

60 years and another for a period of 38 years. Following condylectomy, there was normal function of the uninvolved joint. This should prove conclusively that prolonged fixation does not destroy the function of a normal temporomandibular joint.

■ Free Gingival Margin Flap

Q.—When a flap of the "free gingival margin" type is used, is the epithelial attachment of the tooth destroyed? What are the periodontal implications of such a flap design?—*H. A. McD., New Haven, Conn.*

A.—The free gingival margin flap is an excellent means to gain good access to an operative field in many regions with a minimum of trauma. This incision divides the epithelial attachment of the tooth but leaves a viable portion attached to the low cervical region. When the flap is sutured carefully to place the epithelium regenerates as well as the free gingival margin fibers of the periodontal membrane. These incisions have been employed successfully for many years. As long as the tissues are handled with care and restored to anatomic position good healing and no periodontal complications can be expected. With good surgical principles there is no need to be hesitant in using this flap design.

■ Interference of Adipose Tissue in Upper Third Molar Operation

Q.—While extracting a deeply impacted upper third molar and using a flap reflected high in the tuberosity region the region suddenly was filled with a mass of yellow, soft tissue. It was difficult to complete the procedure and to hold back this tissue. Will you explain the encounter?—*W. H. S., Omaha, Neb.*

A.—When the buccinator muscle and fascia are perforated in this region of operation the large buccal fat pad drops down from above. It is well to avoid injury to this tissue and to close the incision carefully. This region is a fertile field for infections.

■ Treatment of Retained Deciduous First Molar

Q.—Although roentgenograms show a developing bicuspid in succedaneous position, one of my 15 year old patients has a solid deciduous first molar. The retained deciduous molar is a little lower than the occlusal plane. Is it best to wait for normal shedding or to extract the tooth?—*H. R. B., Bakersfield, Calif.*

A.—It would appear that the deciduous tooth may become ankylosed to bone and, therefore, should be removed at once.

■ Impacted Maxillary Third Molars

Q.—Many of my young patients have impacted upper third molars which do not give them any trouble. How should I evaluate these situations and advise my patients?—*Earl Williams, Dallas, Texas.*

A.—If the adjacent second molar has a limited service expectancy because of caries or malposition, its removal may allow the eruption of a well formed impacted third molar into full functional position. Otherwise, if the second molar is in good condition, the impacted third molar must be removed since it will produce malposition or extrusion of the second molar or absorption of the roots. For an account of the orthodontic implications of these impactions refer to the article by Spencer Atkinson (*J. Oral Surg.* 8:136, April, 1950).

■ PROTESE BUCO-MAXILO-FACIAL. Mario Graziani. First edition. 585 pages with 450 illustrations. Index. Sao Paulo, Brazil: Livraria Vademecum Editora, Ltda., 1950.

Professor Graziani's book on buccomaxillofacial prostheses is written in Portuguese, the official language of Brazil. It is intended primarily for those who do surgery and prostheses in the head and neck region, but it is so profusely illustrated that even to the general practitioner of dentistry it imparts much valuable information. Although there are several books on this subject in the English language, this is a much needed volume in Portuguese.

The author gives a historical review of oral and facial prostheses in Brazil from 1919 to the present time. He discusses the general and local factors which enter into the examination of a patient requiring a special prosthesis. Along with this is included a review of the anatomic landmarks and musculature of the mandible and cranium with numerous illustrations.

There is an interesting chapter on the analysis of facial esthetics, and on methods of photography. In logical sequence, Graziani discusses the several impression materials and accessory equipment which may be used, also the pouring and duplicating of models. He then goes into the technics for taking impressions of the face with plaster, wax and the hydrocolloids, followed by the construction of plaster face masks. He concludes the first portion of his book by discussing the materials which are available for making the prostheses, including gelatin, vulcanite, metals, celluloid, resins and latex. Unfortunately the author does not mention the most recent developments, the polyvinyl resins, which have been used successfully in the United States.

The second portion of the book is devoted to the construction of prosthetic appliances by the use of latex and one of the earlier flexible resins. After discussing the treatment of postoperative palatal openings, Graziani reviews extensively the many types of clefts of the palate, together with the appliances suitable for each. This is followed by the subject of speech training, which is dealt with briefly. Speech training is so important a phase of this work that it justifies a separate book by itself and its teaching lies in the field of the speech therapist rather than the dentist.

Many types of mandibular conditions and appliances are shown and technics are given for their management. The author closes with a discussion of prostheses for restoring the nose, eye, ear and tongue.

This book should serve a useful purpose for those interested in this service, particularly in Brazil and Portugal. It should also serve as a valuable library reference book in other countries.—*Stanley D. Tylman.*

■ COLOR ATLAS OF PATHOLOGY. Prepared under the auspices of the staff of the U. S. Naval Medical School of the National Medical Center. 546 pages with 1,053 figures in color on 365 plates. Index. Price $20. Philadelphia: J. B. Lippincott Co., 1950.

This book supplies a universal need for a reliable and inclusive atlas for use in the study and identification of diseased organs and tissues. It is equally suited to the classroom, the laboratory and the clinic. It is impossible to describe the initial enthusiasm created by the generous use of color in the pictorial presentation of pathologic material. This highly favorable first impression is heightened by the excellence and clarity of the first plates on diseases of the hemopoietic system. However,

further examination of the succeeding pages proves once more that neither the color expert nor the most skillful photographer can start with the handicap of a poorly selected and poorly prepared specimen and produce results of a high grade of excellence. There are plates on pages 277, 280, 282 and 286, for example, that fall far short of the high standards attained by the majority of the reproductions. There is a brief text to accompany the pictures that has been prepared with great care and there is also a useful index. There are 23 pages of text and 56 plates covering the diseases of the oral cavity.

The successful completion of such a project was made possible only by the hearty cooperation of a highly competent technical staff with able clinicians and pathologists in such an institution as the Naval Medical school. Both the publishers and the staff deserve the greatest credit for their successful cooperation in this useful project.—*F. H. Hatton.*

■ ANATOMY FOR DENTAL STUDENTS. Mary F. Lucas Keene and J. Whillis. First edition. 342 pages with illustrations. Index. Price $7.50. Baltimore: Williams & Wilkins Co., 1950.

Obviously a rigorous culling was necessary to describe the structure and touch on the embryology of the human body in such brief space. The book is well written and interesting. Illustrations are fairly numerous but too often repeated. The paper and binding and the typography are excellent. However, the place occupied by gross anatomy in American dentistry is such that an abridged volume cannot serve dental students. This book leaves much to be desired.

The objectives in the study of anatomy as set forth in the curriculum of the American Association of Dental Schools can be summarized as follows:

To obtain a general, and in some parts a specific, knowledge of the anatomy of the human body to make possible an understanding of physiology and pathology and a detailed knowledge of the anatomy of the face, jaws and structures directly associated with them. This will make possible an appreciation of the practical applications of anatomy in the clinical practice of dentistry and will also help the student to understand the anatomic background of clinical and research papers.

A volume of 342 pages cannot meet these requirements because too much material is wholly omitted and much that is included is inadequately described.—*K. L. Vehe.*

■ ANESTHESIA IN DENTAL SURGERY. Sterling V. Mead. Second edition. 648 pages. 212 illustrations. Price $12.50. St. Louis: The C. V. Mosby Company, 1951.

This excellent text and reference work, presented in accurate scientific language understood by the dentist, serves as a bridge between the physician-anesthetist and the dental surgeon who frequently calls on him for assistance.

Regardless of the pathology involved, the public considers dental surgery a minor issue, to be met at its convenience at an appropriate time and economic level, without postoperative embarrassment.

Dr. Mead's book indicates how this demand has been and is being met with safety and public satisfaction. His treatment of the problem is well handled. He stresses the importance of teaching and research in dental anesthesia.

The university anesthetist and the chief of the hospital anesthetic service would do well to study carefully the problem of education here presented. The thoughtful diffusion of anesthetic knowledge and experience is not only a duty but may do more to enhance the specialty than will a policy of segregation and preoccupation with ultra scientific research of highly questionable clinical value. Routine anesthetic technics, which in the practice of one man representing 300,000 nitrous oxide and oxygen cases during 35 years with but one fatality, and 35,000 to 40,000 patients in five years with thiopental sodium, without mortality, can scarcely be ignored.

The author subdivides his text into two major divisions—local and general anesthesia. Under each he deals with history, anesthetic

agents, technics, armamentarium and sequelae. An extensive bibliography follows each chapter. The halftones and line cuts are well executed.

The author's preferences are advanced with vigor but with consideration for others.

One note pervades this book. It explains the author's clinical success and the acceptance of his organized efforts by the public. This note is the safety of the patient. Where conflict develops—that is, where the continued use of agent or technic increases the existing hazard—it is immediately abandoned for something safer.

Anesthesia in Dental Surgery is recommended for both dentists and physicians.

Dr. Mead has demonstrated in this academic and clinical work the need for mutual respect and consideration between the fields of medicine and dentistry.—*Paluel J. Flagg.*

■ First Aid—Surgical and Medical. Warren H. Cole and Charles B. Puestow. Fourth edition. 432 pages with 196 illustrations. Index. Price $4. New York: Appleton-Century-Crofts, Inc., 1951.

The authors have thoroughly revised their book. Some of the drugs recommended in former editions have been deleted and newer and more effective ones, primarily the antibiotics, have been included.

In a well ordered fashion the book covers in detail first aid treatment for injuries likely to be sustained both in civilian life and in war. A considerable portion of the book deals with first aid treatment of atomic blast casualties. The authors have achieved a nice balance in their book. Their material, presented with 196 illustrations, should be readily understandable to any first aid worker. The book also could be read with profit by anyone interested in this service irrespective of his training.

As a basis for the discussion of what to do, how to do it and what not to do in an emergency, Dr. Puestow has written Chapter 3 on anatomy and physiology. This chapter contains only 28 pages and yet it is a remarkably comprehensive résumé of the subject. In addition to the two authors, 19 other prominent physicians have contributed material dealing with their specialties.

In these uncertain times when dentists may well be called upon to play an important part in supplementing the services of physicians in an emergency, a book such as this should have an important place in each dentist's library.—*Warren B. Schram.*

■ Cancer: A Manual for Practitioners. Committee on Publication, E. M. Daland, chairman. Second edition. 308 pages. Boston: American Cancer Society (Massachusetts Div., Inc.), 1950.

The second edition of this cancer manual for practitioners effectively serves its purpose. It not only presents useful information on specific types of tumors by site but it also reviews the general trend in some of the phases of cancer research and treatment. Included are chapters on historical trends in the study of cancer, modern cancer research, epidemiologic aspects of cancer, the pathology of malignant disease, the biopsy in relation to tumor diagnosis, symptoms, examination and principles of treatment and treatment of malignant disease by irradiation. Following this basic discussion of cancer, cancer of various anatomic locations, including the lip, mouth, maxilloethmoidal region and salivary glands, is discussed. The chapters are written authoritatively by specialists in the particular fields.

The discussion of cancer of the lip by Grantley W. Taylor, effectively highlights the problem. The statement is made that the low incidence of cancer of the upper lip may be partly due to a lessened likelihood of trauma from carious teeth. A dentist might find this questionable. In explaining treatment of cancer of the lip, the role of the dentist in cleaning up the mouth is adequately discussed.

Charles C. Lund has written the chapter on cancer of the mouth. This chapter covers cancer of the lining tissues of the mouth in excellent fashion. The only material that might be questioned is the emphasis which Dr. Lund places on high protein diet and the use of gonadotrophic hormones in the treatment of

leukoplakia. However, although Dr. Lund has been an advocate of this particular method of treatment for some years, he emphasizes the more usual treatment; that is, removal of all sources of irritation.

Gerald G. Garcelon, in his chapter on tumors of the salivary glands, does not place adequate emphasis on the occurrence of these tumors in the small collection of salivary glands contained within the lips, palate and other regions outside of the major salivary glands of the mouth.

David Weisberger has written the chapter on the role of the dentist in cancer control. He brings out most of the important preventive roles of the dentist. However, Dr. Weisberger casts some doubt on whether the dentist should perform a biopsy. He emphasizes that unless the dentist has had sufficient training to take tissues for pathologic examination, it is advisable to direct the patient to the proper consultant. However, every dentist should be given sufficient training in taking tissue for pathologic examination if cancer is to be controlled in dental patients. Dr. Weisberger suggests that all teeth which will be in the path of irradiation should be extracted. This approach to the problem of teeth in irradiation is not realistic for it is not the direct effect of the rays on the teeth but rather their effect on the salivary glands which is important. For that reason the recommendation of Dr. Lund in his chapter on cancer of the mouth is more useful. Dr. Lund comments that if radiation is to be employed, all diseased teeth, and preferably all teeth, should be extracted before treatment, for the bone is devitalized by irradiation and osteomyelitis or necrosis of the jaw may follow insignificant infection. The high incidence of caries after irradiation emphasizes this need.

Some tumors of dental origin have been overlooked apparently because no dentist or oral surgeon who was interested in them participated in preparation of the volume. Ameloblastomas, other odontogenic tumors, and, in general, tumors of the jaw bones have been omitted from discussion. It is realized that this is a manual, not a text, but such lesions are relatively common and important.

The dentist should have a knowledge of recent advances in cancer research and treatment and in the philosophical approach toward the cancer problem. He also should have specific knowledge of cancer within the region that he treats and have available information on cancer elsewhere in the body. This volume appears to fill these needs adequately and serves as a manual for practitioners in dentistry as well as in medicine. An index would add to its usefulness.—*H. B. G. Robinson.*

■ X RAY TREATMENT, ITS ORIGIN, BIRTH AND EARLY HISTORY. Emil H. Grubbé. 153 pages with 51 illustrations. Price $3. St. Paul: Bruce Publishing Co., 1949.

Most members of the dental profession, who accept as a matter of course the great contribution of the roentgen ray to dental practice, will find this historical text of particular interest. Many have not seen the lesions on the fingers of older dentists who pioneered in the field of dental roentgenography, unconscious of the fact that holding films with their fingers or testing the gas tubes that preceded the present Coolidge tubes exposed them to irreversible damage by the rays.

The author was active in the development of roentgenology from the very beginning. Through lack of knowledge he suffered such serious damage he submitted to 83 operations to save his life. Not so fortunate were more than 100 physicians who are listed by the author as American, British and European martyrs to the advance of roentgenology.

The author devotes Chapter 10 to an interesting discussion and description of the deleterious effects of the rays on his unprotected body over the years. He does not state at which period of his pioneer work he employed measures to protect himself from the rays. Many interesting comments on the treatment of his own burns are included, as well as valuable notes on medical and surgical treatment.

Chapter 11 is devoted to the early history of roentgen ray therapy, the technical and therapeutic problems of the pioneers in this field, and the open hostility and prejudices of

the medical profession because of ignorance, backwardness and jealousy. Included is a chronological history of the progress of roentgen therapy.

Chapter 14 is devoted to the trials and tribulations of his contemporaries, the pioneers in this work, and is a tribute to their untiring zeal.

The final chapter, "X-ray Therapy of Tomorrow," is a prediction of increased future usefulness for this well established method of treatment.

A bibliography and short biography complete this most interesting book.—*C. W. Waldron.*

■ Researches on the Radiotherapy of Oral Cancer. C. A. P. Wood and J. W. Boag. Special report No. 267 of the Medical Research Council. 148 pages with 75 illustrations. Price $1.75. London: His Majesty's Stationery Office, 1950.

The senior author of this excellent report ranks among the best practitioners, outstanding observers and honest reporters of therapeutic radiology. Dr. Wood has devoted years of scientific endeavor to the rationalization of roentgen therapy and curietherapy in order to facilitate teaching, to improve technics and to raise the proportion of successful results. Such an attempt implies of necessity an effort to control dosage, to observe the different radiophysiologic responses to the same physical influence and the statistical evaluation of results. The present report emphasizes three important basic disciplines: physics, radiobiology and statistics.

The first part of the report is concerned with an experimental comparison of roentgen rays and radium rays. It contains a description of an ingenius dose-contour-finder by P. Howard-Flanders. The skin reaction appeared to develop more rapidly and to be more severe under the influence of roentgen rays than of radium rays. Assessment of differences in tumor response was not possible. Differences in wave length of radiations employed did not influence the clinical results.

The second part is concerned with histologic investigations, by A. Glucksmann and F. G. Spear, to determine the relative effects of radiations on the different tumors and to attempt to establish a prognosis.

The third chapter is devoted to the statistical analysis of results. A new statistical method is proposed for the estimation of final success from the interim clinical results. This method of "maximum likelihood," evolved mostly by J. W. Boag, the junior author of the report, groups the patients into (1) those dead from cancer at the time of analysis, (2) those dead from intercurrent disease rather than from the cancer, (3) those alive and symptom-free and (4) those alive but with recurrent or persistent cancer.

Cancer in its different locations, even within the upper air passages, has a great variety of manifestations, not necessarily morphologic, the knowledge of which is as important to the successful treatment as are the physical calculations of dosage. Final results in the treatment of histologically analogous tumors are considerably more dependent on the ability with which the treatment is administered, or upon the possibility or impossibility of administering the minimum necessary dose to the entire tumor area, than on morphologic variations. Statistical evaluation of results in the presence of physical, pathologic and radiobiologic variants, in addition to human error, becomes almost futile, for these factors cannot be properly adapted to mathematical exigency. Change of a member of the staff of a therapeutic institution may more effectively increase the proportion of good results than any other single means. Praiseworthy as the authors' efforts unquestionably are, they have not succeeded in appreciably improving on the results of less scientific but not less skillful predecessors and contemporaries. —*J. A. del Regato.*

■ OBSERVATIONS OF THE PHARYNGEAL FLAP OPERATION FOR THE IMPROVEMENT OF SPEECH IN CLEFT PALATE PATIENTS. Fred Squier Dunn. Plast. & Reconstruct. Surg. 7:530, June, 1951.

This author is very enthusiastic about the possibilities of the pharyngeal flap operation for the improvement of speech in cleft palate patients if the usual operative procedures have failed. He reports on a series of 30 cases operated on between the ages of 8 and 35 years. With the exception of one case, which was a failure because of an uncooperative, psychopathic patient, his results have been good. He notes improvement almost immediately after operation in all cases, especially with the plosive sounds (p and b), and the hard consonants (t, d, k and g). He also notes improvement with the blow test. Within two or three months after the operation, practically all of the unpleasant accessory facial grimaces have disappeared. The complications of this operation have been minimal. In most cases, the speech training period is greatly shortened and most of the patients have been discharged after six sessions.

Dr. Dunn suggests procaine as the anesthetic of choice. He bases his flap at the inferior portion of the pharynx and dissects the full thickness pharyngeal tissue which is advanced forward and securely attached to the bed prepared in the posterior portion of the palate. He suggests the base of the flap be as broad as possible without interfering with the opening of the eustachian tubes. The author considers the pharyngeal flap operation, as originally suggested by Robert E. Moran in 1946, as the outstanding surgical contribution to secondary cleft palate repair.—*Reed O. Dingman.*

■ EFFECTIVENESS OF SOAPS CONTAINING HEXACHLOROPHENE FOR THE SURGICAL SCRUB: SPECIAL REFERENCE TO BAR SOAP. R. R. Best and others. Arch. Surg. 61:869, November, 1950.

Hexachlorophene incorporated in a bar soap more effectively reduces the bacterial flora of the skin than does ordinary bar soap. The use of this special bar soap can materially reduce the time necessary for a surgical scrub and eliminate the scrub brush and irritating alcoholic rinse (alcohol counteracts the bacteriostatic effectiveness of the agent). A sufficient time for a surgical scrub with a soap containing hexachlorophene is three minutes. After scrubbing for one minute, nails should be cleaned and scrubbing continued for an additional two minutes. This total scrubbing time should be lengthened to five minutes if the soap is not used daily for scrubbing or in the daily toilet. Since the cumulative factor and sustained action of hexachlorophene are important in maintaining a low skin bacterial flora it is recommended that hospital personnel, and particularly those with operating room duties, use the bar soap containing hexachlorophene (Dial) in their daily toilet.

Liquid soap containing hexachlorophene has been studied and similar conclusions can be drawn regarding its effectiveness except that it may be irritating to the skin owing to its cocoa oil and potash content. Because of the cost factor incident to the use of bar soap in the operating room as compared with liquid soap, it is recommended that operating room personnel use bar soap containing hexachlorophene in the daily toilet and a liquid soap containing this same agent in the operating room. —*J. K. Paul.*

■ Teaching of Oral Surgery (Correlation of Basic Science with Clinical Practice). Charles W. Freeman. J. D. Educ. 15:144, March, 1951.

In emphasizing the need for correlation of scientific knowledge with clinical practice, Dean Freeman questions whether the student, practitioner or teacher is actually analyzing the scientific aspects of clinical problems or whether he is simply modifying his procedures as a technician to conform to a formula proposed by scientific investigators.

The author feels that oral surgery is the field of dentistry in which there is the greatest practical application of basic scientific knowledge and proposes that, where possible, it be instilled into the oral surgical teaching program. Admitting the limitations in advancing this concept in the undergraduate curriculum, he advocates this type of training with graduate students.

Mentioning that there are few patients requiring even the simplest tooth extraction who cannot be used to convey to the student a very real lesson in pathology and diagnosis, Dr. Freeman points out that the alert and enthusiastic clinical teacher may do much to augment the basic knowledge the students already possess.

The correlation of basic science with clinical practice is the only way the student can acquire a practical appreciation of his backlog of scientific information. Stimulating him within the clinics of the dental school to utilize this knowledge will influence him into continuing that type of patient appraisal in his private practice.—*Bruce L. Douglas.*

■ Deep Neck Infections. Louis F. Knoepp. Am. J. Surg. 82:213, August, 1951.

Deep cervical infections localize and spread in conformity to the anatomy of the lymphatics and fascial components of the neck.

The main methods of spread of infection may be summarized as follows: Local suppuration will invade the nearest lymph nodes: namely, buccinator and parotid nodes, submaxillary or other nodes and suboccipital and superficial cervical nodes. All superficial lymph nodes may abscess and localize at their anatomic sites; namely, submental, submaxillary, buccinator, and so forth. If lymph node suppuration continues without access to drainage, deep spaces may be involved; namely, geniohyoid, submaxillary and lateral pharyngeal, parotid and buccinator spaces. Fascial spaces may spread infection to one another and may be involved directly before lymph nodes suppurate. Some fascial spaces gravitate to the mediastinum; namely, retropharyngeal space and carotid sheath.

In recognizing deep neck infections one must, of course, search for the source. In this connection one should look for dental foci whether they are alveolar abscesses or merely the result of recent operative dental interference. Tonsils and pharyngeal lesions account for another large percentage. Osteomyelitis of the mandible, infected sebaceous and branchial cysts and furuncles comprise a smaller group. Trauma may be the initiating factor in some. Symptoms of space infections may be catalogued under three headings: (1) septic; (2) asphyxial; (3) vascular. Septic symptoms of fever, chills, sweating and prostration may accompany any septic process. Chills may have a more potential significance in those cases in which bacteria have entered the blood stream. Pain is common to all and may not be localized except in denoting the side and relative area of involvement. Trismus occurs when pressure is exerted on the deep muscles of mastication, particularly the internal pterygoid muscle.

The asphyxial symptoms are the most alarming. So-called Ludwig's angina is a classical example in which the geniohyoid space is involved. Pressure of the abscess elevates the floor of the mouth beneath the tongue pushing it high against the palate. Pressure is continued around the larynx to such a degree that laryngeal edema may develop. Lateral pharyngeal abscesses, particularly those which are paratonsillar, produce deviations of the faucial components and obstruct the pharynx laterally.

When there is evidence of pus, surgical drainage must be performed without delay. In those cases in which the presence of suppura-

tion is questionable one must evaluate the clinical progress with the findings. Swelling and induration in a septic patient which cannot be construed as simple adenopathy is safest explored and drained. The need for exploration progresses with the degree of sepsis and induration. All patients are put on a sepsis regimen. Fluids are forced to 4 or 5 L. intake daily. Aqueous crystalline penicillin, 50,000 units every three hours, is initiated. Complete hematologic studies and urinalysis are done. Progress is noted on the change of local physical signs every 12 hours. If chills have occurred, a blood culture is taken and intravenous sulfadiazine is given additionally. The location of surgical drainage depends on the space involved. All surgical explorations on the neck are done with local anesthesia. Submental abscesses are incised horizontally below the chin. Lateral pharyngeal infections are approached beneath the angle of the mandible just posterior and inferior to the submaxillary gland. The parotid space should be approached by a horizontal incision in the direction of the facial nerve even though the nerve lies deep to the gland.

Submaxillary gland infections which have become chronic may require subsequent excision of the gland. Osteomyelitis of the mandible may require protracted treatment. Teeth which are responsible for cervical abscesses may be removed when drainage from the abscess has ceased and sepsis has been absent for a few days. Most subsequent dental extractions in the writer's experience have been deferred for some 7 to 10 days from the time of external drainage.

An analysis of 74 cases of deep neck infection is related herein exemplifying points in the incidence, location, mode of spread and management. It is interesting that dental infections accounted for 43 of those seen and that a large percentage of these were preceded by dental extraction.—*Myron Kaufman.*

■ TUMORS AND CYSTS OF THE NECK. Arnold S. Jackson. Am. J. Surg. 82:93, July, 1951.

Tumors and cysts of the neck form one of the most interesting diagnostic and surgical problems, one that in many instances offers insurmountable obstacles and yet frequently rewards the surgeon with unexpected and gratifying results. Possibly in no other part of the body do so many distinct pathologic entities occur in so small a region.

A classification of tumors and cysts of the neck is presented. No classification ever has and probably ever will prove satisfactory to those interested in the subject, and the author offers this one merely as a working hypothesis. The main groups in this classification are: tumors of the thyroid and parathyroid glands; tumors of salivary glands; primary tumors of lymph glands; secondary tumors of the neck; benign tumors; unusual tumors; cysts and fistulas; inflammatory lesions. The lesions falling under these headings are discussed briefly as to location, diagnosis and treatment.—*Myron Kaufman.*

■ SALIVARY TISSUE NEOPLASMS. James W. Hendrick, Grant E. Ward and Marvin M. Lacy. Am. J. Surg. 81:373, April, 1951.

The parotid gland offers special anatomic problems from a surgical standpoint and consists essentially of two lobes, a larger superficial lobe and a smaller retromandibular lobe. These lobes are connected by an isthmus that winds around the ascending ramus of the mandible. The facial nerve, after leaving the stylomastoid foramen, passes anteriorly and slightly downward to the posterior edge of the isthmus. Only a few of its filaments enter the substance of the superficial lobe which permits most benign tumors to be dissected without danger of injuring the facial nerve. Tumors arising in the superficial lobe, especially in its lower pole, frequently grow to enormous size without involving branches of the facial nerve; however, small tumors arising in the retromandibular lobe may involve the lower branches of the facial nerve early. Tumors or infections developing in the retromandibular lobe produce symptoms early, with resulting trismus.

Inflammatory lesions of the salivary glands frequently must be differentiated from neo-

plasms. Mikulicz's disease and sarcoidosis may involve either the parotid or submaxillary glands, or both.

Mixed tumors are the most common neoplasms and affect all salivary tissue, parotid, submaxillary, sublingual and aberrant salivary tissue wherever located. The parotid gland is more frequently involved by benign and malignant tumors than other salivary tissue.

The typical mixed tumor of the parotid develops as an ovoid, bosselated tumor below and in front of the ear. They are seldom encountered in the upper portion of the gland, in contradistinction to malignant lesions. The facial nerve is infrequently involved unless malignant transformation ensues or the tumor develops in the retromandibular lobe.

Recurrent tumors retain their original structure to a degree. The secondary growth is more cellular and has a greater tendency to become malignant. Malignant mixed tumors occur in a gland that has not been previously operated on or one that was incompletely removed. Their growth is slow as contrasted with primary malignant growths.

Recurrent tumors tend to remain locally invasive; consequently, extensive recurrent growths frequently are amenable to adequate surgical removal.

Adenomas and cysts of salivary tissue are not frequently encountered. They begin as small encapsulated nodules of gland tissue and are thought by some to be congenital displacements. They more frequently occur in the upper lobe of the parotid and are infrequently encountered in the submaxillary or sublingual glands.

Primary malignant lesions of salivary tissue are more commonly encountered in an older age group, as noted in cancer elsewhere in the body.

The growth more frequently begins in the upper pole or in the retromandibular lobe. Primary malignant lesions may grow with such rapidity that they simulate an inflammatory lesion.

Histologically there are three main varieties of primary carcinoma of salivary tissue; namely, adenocarcinoma, alveolar carcinoma and atypical carcinoma. Adenocarcinomas may be either papillary or alveolar in form.

Mixed tumors are unresponsive to irradiation therapy. Treatment is complete surgical excision of the tumor with its capsule, plus an area of tissue 0.5 to 1 cm. wide around it, reducing recurrence to a minimum.

A radical operation is imperative for carcinoma of the parotid gland, the patient being informed that the facial nerve probably will be partially or completely sacrificed along with removal of the node-bearing tissue. Benign tumors involving the submaxillary glands are removed by total excision of the entire gland through an inframandibular incision.

Aberrant salivary tissue may be present in the palate, cheeks, lips, nares, pharynx and skin of the face and neck. Since salivary gland tissue arises from outgrowths of the primitive oropharynx, it is obvious that aberrant salivary gland tumors can be found in the afore-mentioned locations. Like aberrant tissue located elsewhere these tumors more frequently undergo malignant change than tumors encountered in salivary tissue in its normal habitat.—*Herbert J. Bloom.*

■ Unoperated Bilateral Complete Cleft Lip and Cleft Palate in the Adult: A Case Report and Comments. Albert D. Davis. Plast. & Reconstruct. Surg. 7:482, June, 1951.

This author has had the rare opportunity of studying an unoperated bilateral complete cleft lip and cleft palate in a negro male aged 45. Aside from the deformity, the patient has enjoyed perfect health throughout his life. He has had no difficulty in eating or breathing and his speech was no worse than in some cases seen with surgical failures. Except for some atrophy of the muscular elements due to disuse the structures involved were as fully developed as might be expected in a noncleft state. It was concluded that the congenitally deformed parts grow at a normal rate. Craniofacial morphology roentgenograms were made to obtain the cephalometric measurements. Tracings showed the measurements within normal limits. The

prolabium was well developed. The lateral halves of the maxilla almost met behind the premaxilla which was protruding. In this case, the prolabium was a soft inert mass without musculature. The premaxilla contained the two maxillary central incisors; the lateral incisors on each side were in the lateral maxillary processes. The author comments on several thoughts prevalent in the management of cleft lip and cleft palate patients. He states that in many clinics the prolabium is used as the entire central portion of the lip in the constructive procedures. He prefers, however, to use as the vermilion, the vermilion of the lateral sides of the cleft, and he does not depend upon the vermilion of the prolabium to furnish the vermilion of the center portion of the lip. The lip and palate were closed in one operative procedure each. The article is well illustrated by photographs and roentgenographic tracings.—*Reed O. Dingman.*

■ A Serial Study of Mandibular Growth After Removal of the Condyle in the Macaca Rhesus Monkey. Bernard G. Sarnat and Milton B. Engel. Plast. & Reconstruct. Surg. 7:364, May, 1951.

Mandibular growth is a result of an integration of activities in a number of regions. Two types of bone growth occur in the following principal areas: (1) appositional, at the posterior border of the ramus, the sigmoid notch, the coronoid tip and the alveolar margin adjacent to the teeth; (2) epiphyseal-like growth, at the condyle. The characteristic clinical and roentgenographic observations in the human being following disturbed growth of one condyle are: (1) a short, wide ramus, a short body, a preangular notch, fullness of the face on the side of injury; (2) on the opposite uninjured side, elongation of the body and a flat underdeveloped appearance of the face; (3) malocclusion with the mandible skewed toward the side of the affected condyle. With a bilateral condylar growth arrest there is usually a symmetrical lack of growth of the mandible. The purpose of this report is to determine by serial roentgenographic and gross studies the early effects of surgical removal of one or both mandibular condyles on the growing mandible. To accomplish this and also to obtain dissected specimens for detailed study, the macaca rhesus monkey was selected.

Where the resection was unilateral the osseous asymmetry was clearly revealed. There was a shift in the mandibular midline toward the side of the resection. The changes in the mandible consisted of failure of growth in ramus height, some remodeling of the posterior border of the ramus and slight preangular notching. In the region of resection a thickening of the bone was found, particularly on the medial aspect. This seemed to be an attempt at re-duplication of the condyle and was more pronounced in those animals of a longer postoperative survival period. If one condyle had been completely removed, the ramus was considerably shorter when compared with the opposite unoperative side. The mandibular angle was more nearly a right angle, whereas in the normal mandibles it tended to be obtuse. The mandibular ramus did not appear to be as thick as the normal and was, therefore, more translucent.

Growth of the mandibular body in length was not affected as was that of the ramus. Where both condyles had been removed there was an opening of the bite in the incisor region.

If an adequate amount of bone is removed with the condyle, however, there is no need to insert an interposing substance to prevent ankylosis.

Although the regenerated mandibular condyle fulfilled its articular function satisfactorily, it lacked the growth potential and anatomic configuration of the normal condyle. Normally, the coronoid tip was at the level of the zygomatic arch in the animals which were not operated on. When the condyle was removed, the coronoid tip was above the zygomatic arch. In the animals in which only one condyle was removed the ramus of that side was much shorter and somewhat wider than on the untreated side.

The antegonial notching and distortion of the body of the mandible were not prominent in the experimental animals.

In children with ankylosis of the temporo

mandibular joint, it may be desirable to postpone resection of the condyle until maximal mandibular growth has been attained. It should be ascertained whether or not the growth center of the condyle has been destroyed. If the study indicates that growth activity is continuing, postponement of surgical intervention should be considered in order to avoid a more severe growth arrest.—*Herbert J. Bloom.*

■ The Correction of Ankylosis of the Jaw and Associated Deformities of the Face. Kenneth L. Pickrell, N. John Wilde, Benjamin F. Edwards, Thomas R. Broadbent and Nicholas Georgiade. Ann. Surg. 134:55, July, 1951.

There are two dominant factors which influence the development and ultimate contour of the face. One is the growth potential inherent in germ plasm which determines the sites of growth. The other is the response to function which influences the rate and degree of growth. The forces of mastication, swallowing and talking are transmitted through muscle pull and direct pressure to those growth areas. Any etiologic factor causing an ankylosis before the cessation of growth at the condylar growth center—16 to 18 years—will destroy or inhibit its function since mastication and other movements of the mandible have ceased. As a result, there is not only the maldevelopment of the mandible, but also an underdevelopment of the face owing to the lack of forward and downward growth which would have been brought about by stimulation of the growth centers through function. Since it is through the teeth that the masticating forces influence growth and development, dental and orthodontic consultation and treatment should be obtained following correction of the ankylosis.

There are several etiologic factors that may bring about ankylosis. These factors may cause changes in the joint proper or in adjacent tissues. Trauma to the chin from a fall or blow, fractures of the mandible, extension of infection from the teeth, middle ear, mastoiditis, tonsillar abscesses, or pharyngitis, infectious diseases, such as rheumatic fever and gonorrhea, and generalized systemic diseases, such as rheumatoid arthritis and Marie Strümpell disease, are the most common etiologic factors. Congenital ankylosis is rare. Soft tissue tumors, bone tumors, bony excrescenses or hyperplasia of the condyle may cause partial ankylosis.

Before operation one should differentiate, if possible, between articular ankylosis, extra-articular ankylosis and a combination of these, and between unilateral or bilateral ankylosis. In true bony ankylosis there is no lateral movement and absolute lack of protrusion of the jaw. In unilateral extra-articular ankylosis, protrusion is possible. In bilateral intra-articular ankylosis, no forward thrust is possible. In soft tissue fixation, normal protrusion may be present.

The treatment of ankylosis of the jaw is primarily surgical. In reviewing the literature, the authors state that more than 18 different procedures have been used for correcting this deformity. Two operations, with variations, are used almost exclusively at present. One is condylectomy in which the condyle and neck of the involved joint are resected. Many investigators feel that if sufficient bone is removed by this procedure, the insertion of tissue or other materials for maintenance of the resected space and prevention of recurrence is not necessary. The other procedure is ostectomy of the ramus, in which a false joint is constructed after resecting the ramus. Risdon popularized this operation but the others present a modification of this procedure in which the level of resection and the use of the interpolated masseter flap differ greatly. One centimeter or more of bone is removed and the fasciculi of the posterior third of the masseter muscle are severed inferiorly at their insertion into the angle of the mandible and interpolated into the space created by the ostectomy and tucked behind the sectioned ramus. The interposition of this muscle mass prevents apposition of the cut bone surfaces, and will act as a stabilizer for the newly constructed false joint. This operation for ankylosis is described in detail by the authors and a brief discussion of the causes and prevention of recurrence is presented.—*Myron Kaufman.*

Announcements

■ Great Lakes Society of Oral Surgeons

A group of seventy-eight oral surgeons from Ohio, Michigan and Western Pennsylvania met at the Statler Hotel in Detroit on September 16, 1951, to form a new regional oral surgery society, the Great Lakes Society of Oral Surgeons.

The following officers were elected: P. J. Aufderheide, Cleveland, president; Harold H. Sell, Cleveland, president-elect; Philip M. Northrop, Ann Arbor, vice-president; Bruce B. Cook, Detroit, secretary-treasurer.

The society will meet once a year. For further information write Bruce B. Cook, 10314 Puritan Avenue, Detroit.

■ Third Annual Berkshire Conference in Periodontology and Oral Pathology

The Division of Graduate and Postgraduate Studies of Tufts College Dental School will conduct the third annual Berkshire Conference in Periodontology and Oral Pathology at Eastover, a resort hotel in Lenox, Mass., June 15-19, 1952. The conference will consist of four days of lectures, seminars and panel discussions regarding clinical problems by outstanding teachers and clinicians in dentistry, medicine and their related fields.

For further information regarding this conference write to the Berkshire Conference, Tufts College Dental School, 136 Harrison Avenue, Boston 11.

■ American Society of Oral Surgeons

At the thirty-third annual meeting of the American Society of Oral Surgeons, held in Washington, D. C., October 10-13, 1951, the following were elected to office: W. T. Ewing, Akron, Ohio, president; D. C. McRimmon, Fort Worth, president-elect; Don H. Bellinger, Detroit, vice-president; Frank B. Hower, Louisville, Ky., secretary-treasurer. Miss Ruth F. Whalen was appointed executive secretary.

The thirty-fourth annual meeting will be held in New Orleans, October 8-11, 1952.

■ Postgraduate Training at New York University College of Dentistry

The periodontia department of New York University College of Dentistry announces its full-time course in periodontia and oral medicine for one academic year, September 22, 1952, to May 22, 1953, leading to a certificate. The course is limited to four.

Half-time, two year courses are also given, as well as a three weeks refresher course beginning June 2, 1952. All courses are under the direct supervision of Dr. Samuel Charles Miller.

For further information write Postgraduate Division, New York University College of Dentistry, 209 East Twenty-third Street, New York 10.

■ Cincinnati Dental Society March Clinic Meeting and Children's Dental Health Day

The Cincinnati Dental Society March Clinic Meeting and Children's Dental Health Day will be held at the Netherland Plaza Hotel on March 23-25, 1952.

For further information write H. Lawrence Miller, Chairman of Publicity, 526 Doctors Building, Cincinnati.

■ Graduate and Postgraduate Studies at Tufts College Dental School

Courses in minor oral surgery will be presented throughout the academic year of 1951-1952. Tuition will be $125 for the eight weeks from January 23 to March 12, 1952. Tuition will be $100 for the period from June 2 to 6, 1952.

Information may be obtained by writing to the director of the Division of Graduate and Postgraduate Studies, Tufts College Dental School, 136 Harrison Avenue, Boston 11.

■ Sixth Annual Meeting of the Academy of Oral Pathology

The Academy of Oral Pathology will hold its sixth annual meeting at the Conrad Hilton (formerly the Stevens) Hotel, Chicago, February 3, 1952.

The program will include discussions on the physiology of bone, bone behavior, periodontal disease, dermatological diseases affecting the oral cavity, studies of oral carcinomas, dental anomalies and gingival enlargement.

All interested dentists are welcome to attend.

■ International Dental Congress Scheduled To Meet in London

The eleventh International Dental Congress, sponsored by the Fédération Dentaire Internationale, will be held in London, July 19-26, 1952. Scientific reports to be presented for discussion at the Congress will be published in the four issues of the *International Dental Journal* dated September 1951 to June 1952.

For further information write to G. H. Leatherman, Honorary Secretary, 13 Hill Street, London, W. 1.

Editorial communications

■ ORIGINAL COMMUNICATIONS—This journal invites concise original contributions in the broad field of clinical and experimental surgery of the mouth and associated structures, including roentgenology, diagnosis, anesthesia and oral surgical pathology. Articles are accepted for publication with the understanding that they are contributed solely to the JOURNAL OF ORAL SURGERY. All manuscripts are subject to editorial modification. Neither the editors nor the publishers accept responsibility for the views and statements of authors expressed in their communications.

■ MANUSCRIPTS—Manuscripts submitted for publication should be sent to Reed O. Dingman, Editor, 221 North Ingalls Street, Ann Arbor, Michigan.

Manuscripts should be typewritten on one side of the paper only with double spacing and liberal margins. The author's name and the abbreviated title of the article should appear at the top of each manuscript page. The original should be sent to the editor and a carbon copy retained by the author. Manuscripts will not be returned if accepted for publication.

References should be placed at the end of the article and should conform to the style of the Quarterly Cumulative Index Medicus; viz., name of author, title of article and name of periodical with volume, pages, month and year. They should be numbered and should appear in the same order as that of the superior figures inserted in the appropriate positions in the text.

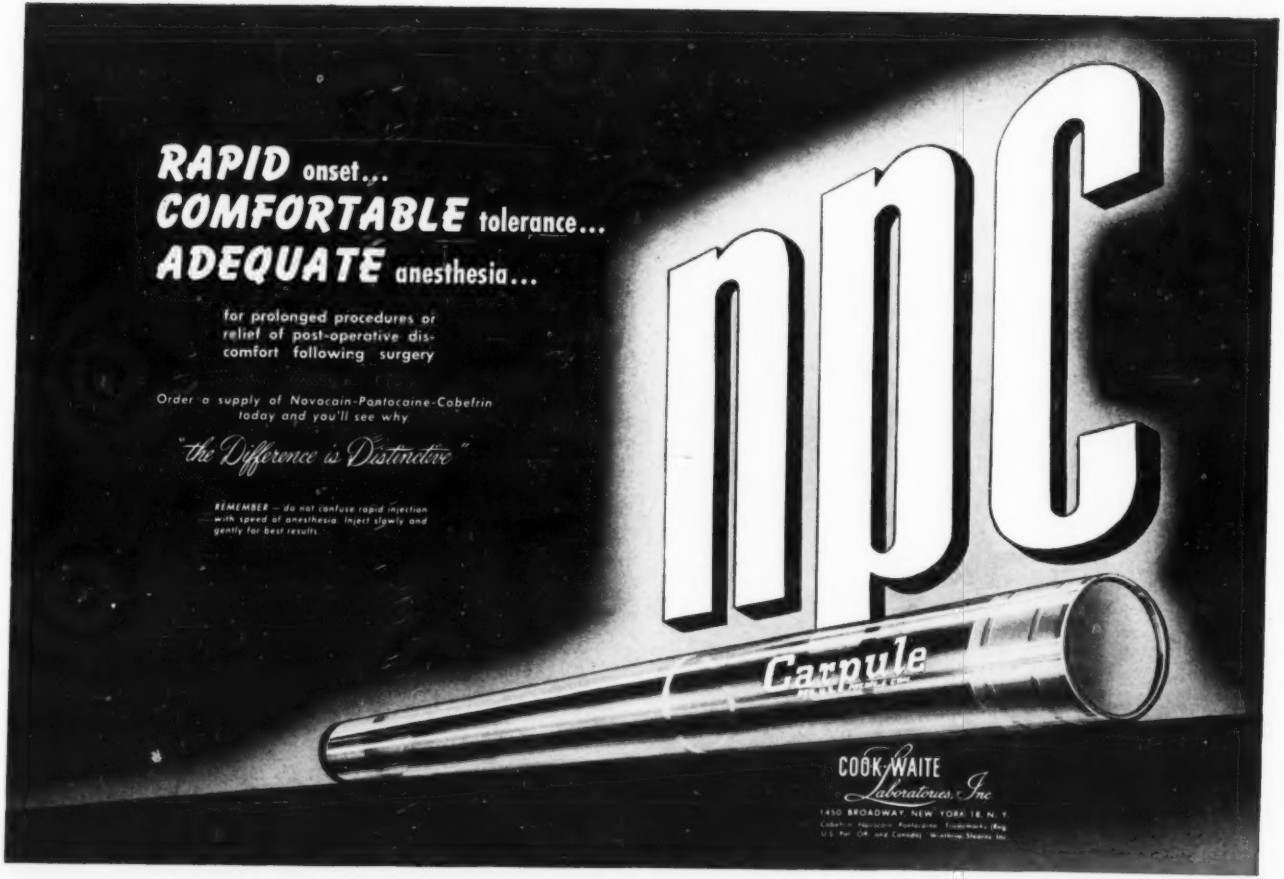
■ ILLUSTRATIONS—Illustrations accompanying manuscripts should be unmounted and numbered. The author's name should appear on the margin or back.

Authors should insert figure numbers at appropriate places in the text. The original drawings, or glossy print photographs of them, should accompany the manuscript. Legends for illustrations are to be typewritten in a separate list with numbers corresponding to those on the photographs and drawings.

A reasonable number of halftone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editors for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered in India ink or with black typewriter ribbon (carbon paper placed with carbon against back of sheet for bolder type). Ordinary blue or colors will not reproduce. Only good photographic prints or drawings should be supplied for halftone work.

■ CASE REPORTS—Case reports will constitute an important department of the journal and the editors welcome case reports that are of unusual clinical value or that present exceptional conditions of interest to dental surgeons.

■ EXCHANGES—Letters, exchanges, reprints and all other communications relating to the JOURNAL OF ORAL SURGERY should be sent to the American Dental Association, 222 East Superior Street, Chicago 11.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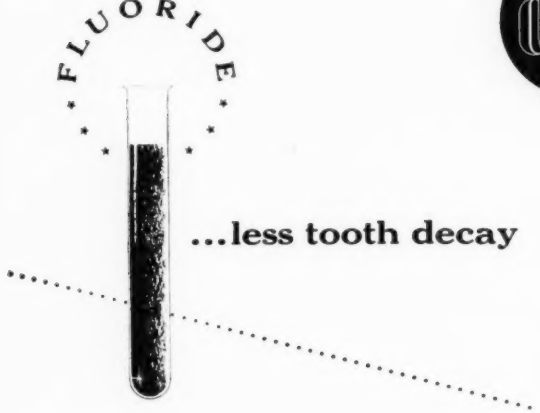

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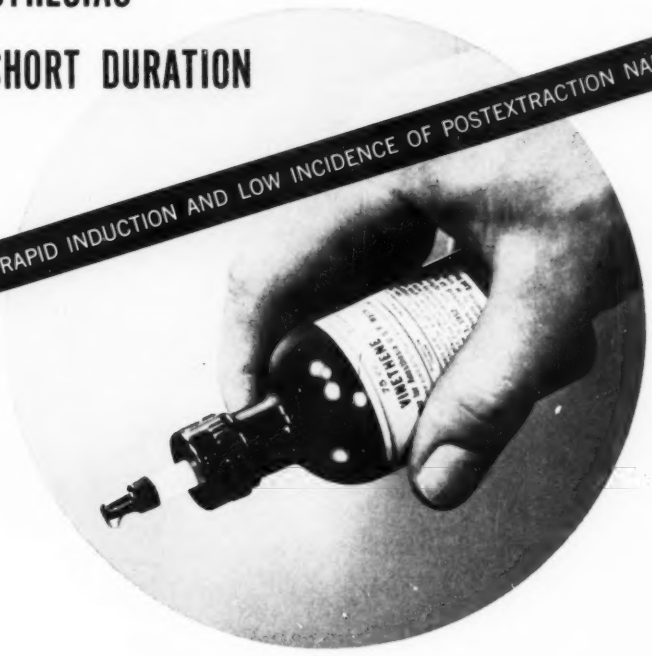

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